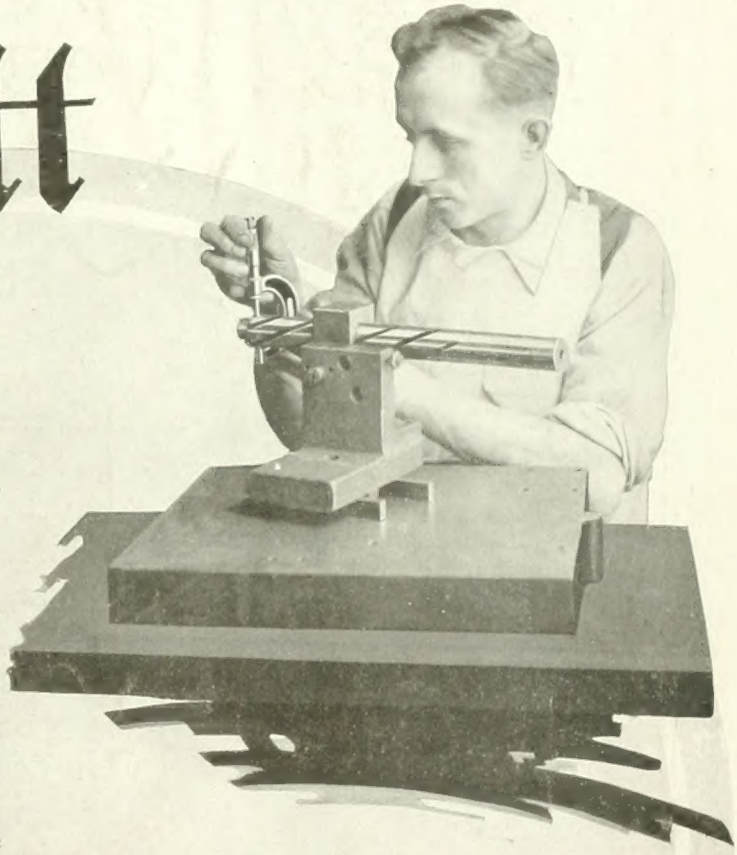
CANADIAN MACHINERY AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical, power, foundry and allied fields.
Published by The MacLean Publishing Company, Limited, Toronto, Montreal, Winnipeg and London, Eng.

Vol. XVIII—No. 16 Publication Office: Toronto, October 18, 1917 Subscription Price $3.00 per Year

Starrett Tools



"Accurate as ever after 22 years of service"

Twenty-two years of service! It is hard to realize what that means.

During the experimental stages of the automobile and telephone, and at a time when the wireless and aeroplane were only dreamed about, this Starrett micrometer was giving accurate service.

Our railroads were in the making, our western cities scarcely begun when this micrometer first measured in thousandths. Through all these years of rapid development it has had its share in making possible the accuracy of fit demanded by modern inventions and machines.

And yet this Starrett micrometer is not exceptional but typical of the 2100 styles and sizes of Starrett precision measuring tools.

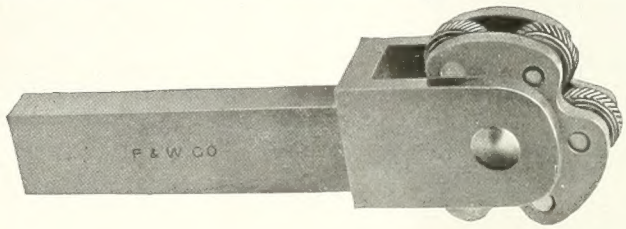
Catalog No. 213 on request.

THE L. S. STARRETT COMPANY
The World's Greatest Tool Makers
ATHOL, MASS.
NEW YORK LONDON CHICAGO

STARRETT TOOLS

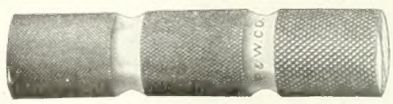
SMALL TOOLS

P. & W. Combination Lathe Knurling Tool



Combines Three Distinct Knurling Tools in One

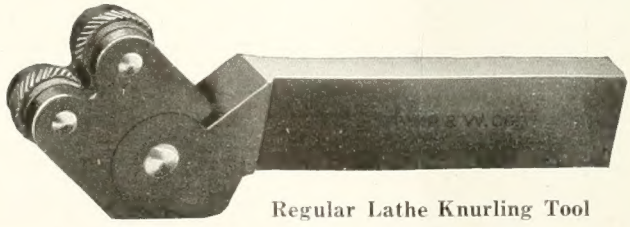
You will save time by using this three-in-one Lathe Knurling Tool. It carries three pitches of knurls, fine, medium and coarse, as shown in sample. This does away with necessity of having three holders or of changing knurls where but one holder is available. Same knurls can be used in this holder as are used in our regular Lathe Knurling Tool.



Fine Medium Coarse

PROMPT SERVICE

is assured at our nearest store where P. & W. Small Tools are carried in stock. Place your order there to-day.



Regular Lathe Knurling Tool

Precision Machine Tools—Standards & Gauges

PRATT & WHITNEY CO.

of Canada, Limited

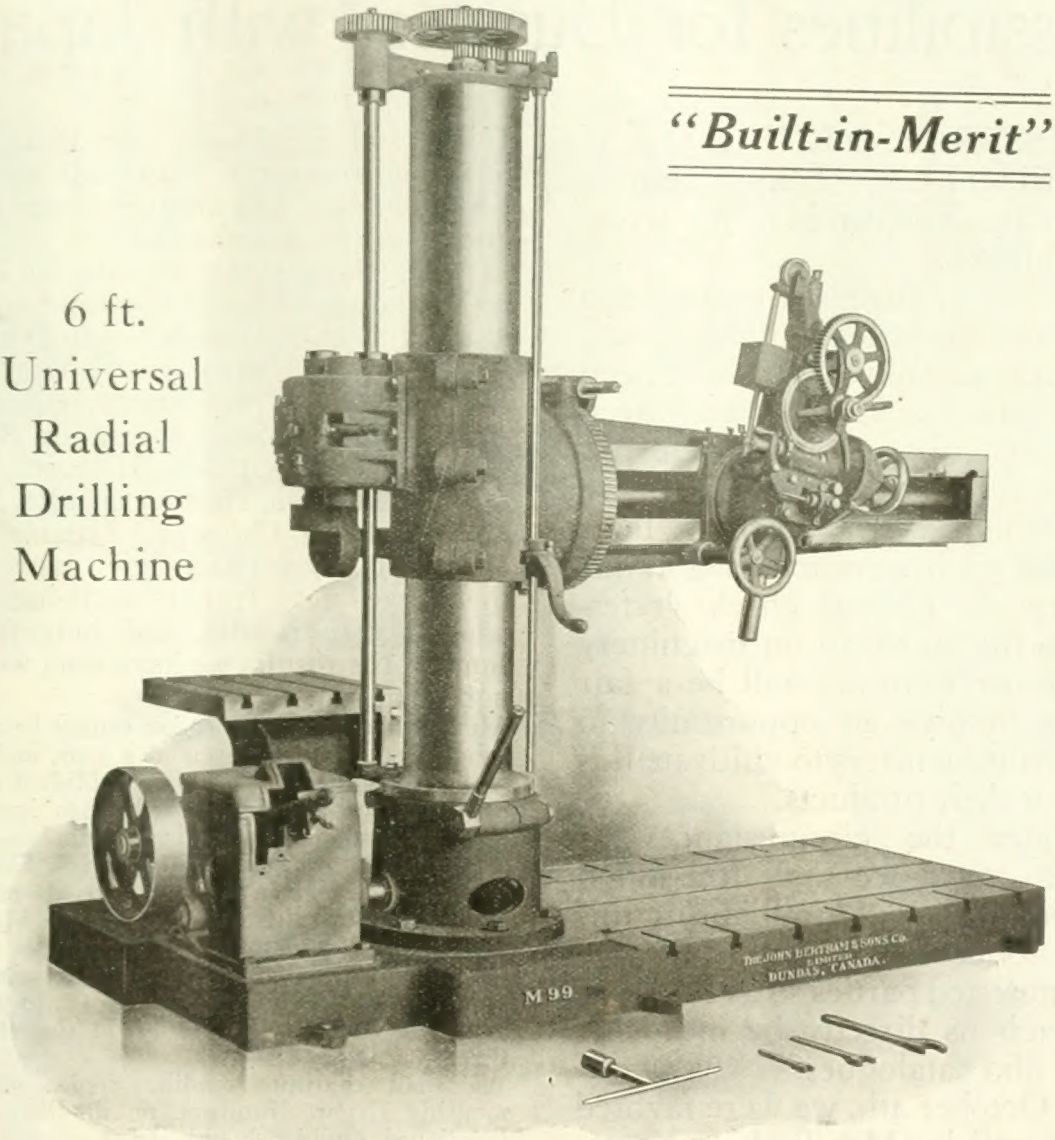
Works: DUNDAS, ONTARIO

MONTREAL	TORONTO	WINNIPEG	VANCOUVER
723 Drummond Bldg.	1002 C.P.R. Bldg.	1205 McArthur Bldg.	B.C. Equipment Co.

BERTRAM MACHINE TOOLS

"Built-in-Merit"

6 ft.
Universal
Radial
Drilling
Machine



DROP US A LINE FOR PHOTOGRAPHS AND FULL DETAILS
on any machine or machines in which you are interested

The John Bertram & Sons Company Limited

DUNDAS, ONTARIO, CANADA

MONTREAL	TORONTO	VANCOUVER	WINNIPEG
723 Drummond Bldg.	1002 C.P.R. Bldg.	609 Bank of Ottawa Bldg.	1205 McArthur Bldg.

If any advertisement interests you, tear it out now and place with letters to be answered.

The Publisher's Page

TORONTO October 18, 1917

Possibilities for Business with Japan

MESSRS. ROKU-ROKU SHOTEN, Tokyo, Japan, under date of September 17th, wrote us as follows:

"We beg to introduce ourselves to you as one of the leading machinery importers in Tokyo, who have been in the business for the past fifteen years, devoting ourselves exclusively to the line of machine tools. . . .

"Although your machine tools have not yet been much used in this country the present check (referring to the embargo on machinery from other sources) will be a fair chance to give an opportunity to your manufacturers to cultivate this field for their products.

"Under the circumstances as hitherto stated we shall feel much obliged if you will kindly bring this to the notice of your manufacturers and interested parties so as they may approach us directly by means of letters and catalogues."

On October 4th, we were favored with a call by Mr. Toshiro Yamashita, representing Mitsubishi Co. of Tokyo, naval architects and engineers, and the oldest and largest shipbuilding firm in Japan.

We have received this week subscriptions from the Tokyo Chamber of Commerce (you will understand the full significance of this).

Two subscriptions from Takata and Co., Tokyo and Kitahama. Another subscription from the Kawasaji & Co., Kove, Japan. And another from Siber Migner & Co., Yokohama.

For the past eighteen months we have been sending over one thousand copies of the first issue of each month (known as our Export Numbers) to a carefully compiled list of machinery importers and large machinery users in Great Britain, France, Russia, Holland, Norway and Sweden, Italy, Australia, New Zealand, India, China and Japan.

Many of our advertisers have expressed themselves very frankly as being well pleased with results, and judging by some of the results we have seen we are not surprised.

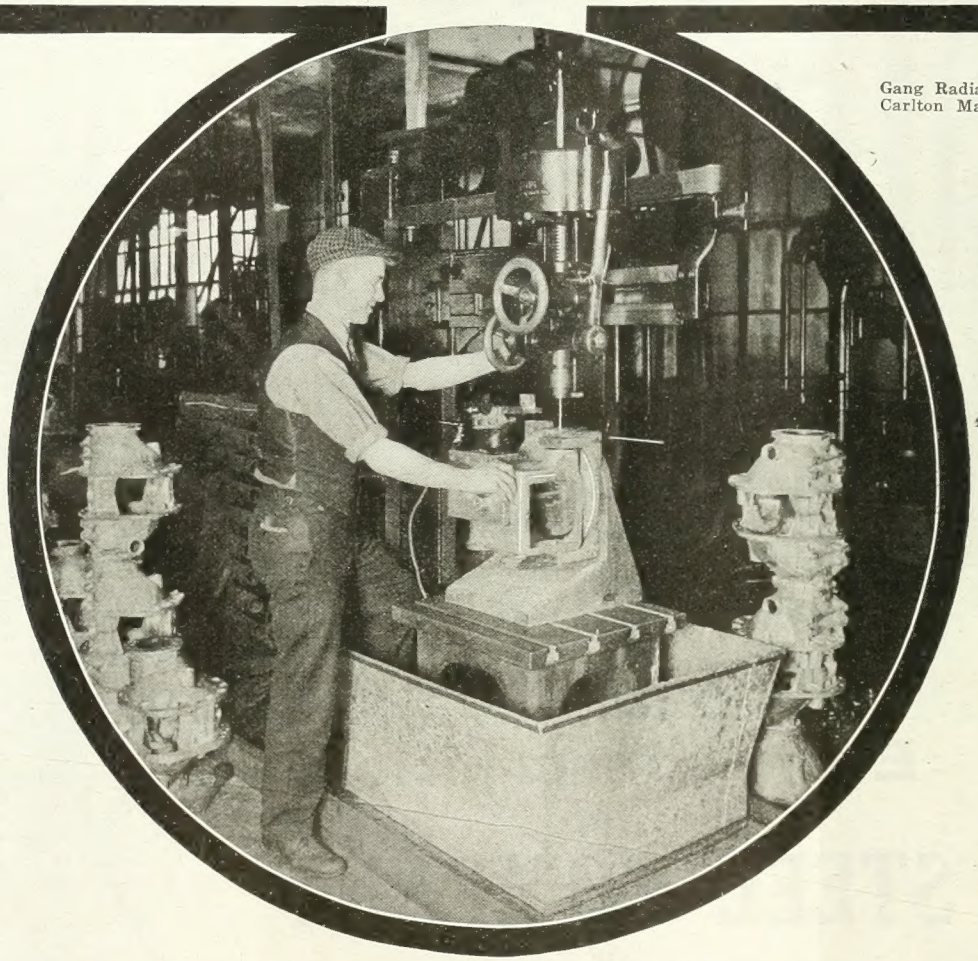
A profitable export connection cannot be established in a month or even in a year, and if a profitable connection is to be established at all manufacturers should be willing to invest a little in preliminary cultivation, or as it is commonly known, missionary work. The war seems to have given Canada an exceptional opportunity to cultivate the Japanese, Chinese and Australian markets. Opportunities exist, too, in Great Britain and in France, Russia, etc., although transportation to the latter countries offers very serious difficulties at the present time.

We shall continue sending copies of our monthly Export Numbers to the list above mentioned, and we should like to carry a message regarding your line in our next and succeeding issues.

Full particulars will gladly be sent upon request and without placing you under any obligation. Our next Export Number will be dated November 1st. Copy and cuts should be in our hands by October 22nd or 23rd. And in preparing a message for the foreign reader and for the average foreign buyer, remember that cuts tell a plainer story than words. Use lots of cuts and sufficient space to display them properly.

If any advertisement interests you, tear it out now and place with letters to be answered.

SKF



Gang Radial Drill made by the Carlton Machine Tool Co.

BALL BEARINGS

No. 2 of a Series of SKF Equipped Drilling Machines

ACCURACY

For accurate work drilling machines must be accurately built. Spindles, shafts, gears—all must be mounted with extreme exactness.

The accuracy of S K F so well known to the builders of machine tools is a permanent one, created within the most exacting manufacturing limits.

Our Engineering Service Department would welcome the opportunity of discussing your bearing problems with you.

Canadian SKF Company, Limited

Toronto Ontario Canada

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.

DIAMOND

LANDIS NORTON

All sizes, finest quality, awaiting your command, stones

"THAT SUIT"

either unmounted or mounted in our improved (any style) CAST STEEL MOUNTING;

GUARANTEED TO BRING RESULTS.

"MADE IN CANADA"

WHEEL TRUEING TOOL CO.

88 WEST PITT STREET WINDSOR, ONTARIO

FERRO-URANIUM *The Latest Discovery in Alloys for Efficient*

High-Speed and Other Steels of Quality

IT INSURES TOOLS THAT STAND UP ON THE JOB

Largest Producers in the World of URANIUM

WRITE US FOR PARTICULARS

STANDARD ALLOYS COMPANY

Forbes and Meyran Aves. -:- Pittsburgh, Pa.

UNIFORMITY

USED THE WORLD OVER

SATISFACTION

Atlas Babbitts

MADE IN CANADA

AMACOL **TENAXAS** **DURASTIC** **TIN-TOUGHENED**
ADAMAS **ATLAS** **MASCOT** **W. E. W. BABBITT**

These Babbitts are the result of years of experience and have a world-wide reputation for uniformity and reliability.

No Shock Too Severe **No Load Too Heavy** **No Speed Too Great**

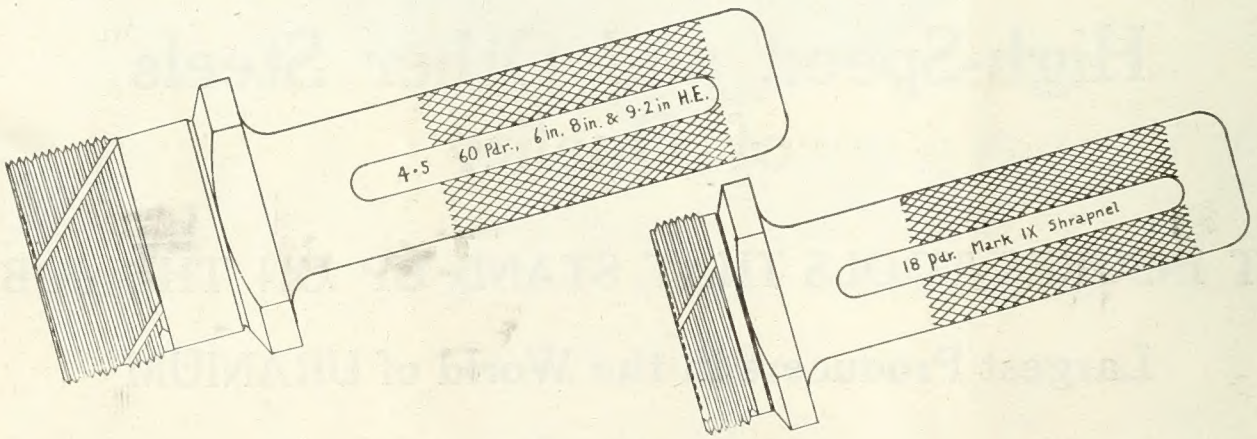
ATLAS METAL & ALLOYS COMPANY OF CANADA, LIMITED, MONTREAL

Sales Agents:

The Canadian B. K. Morton Co., Limited

MONTREAL: 49 Common Street. TORONTO: 86 Richmond Street East.

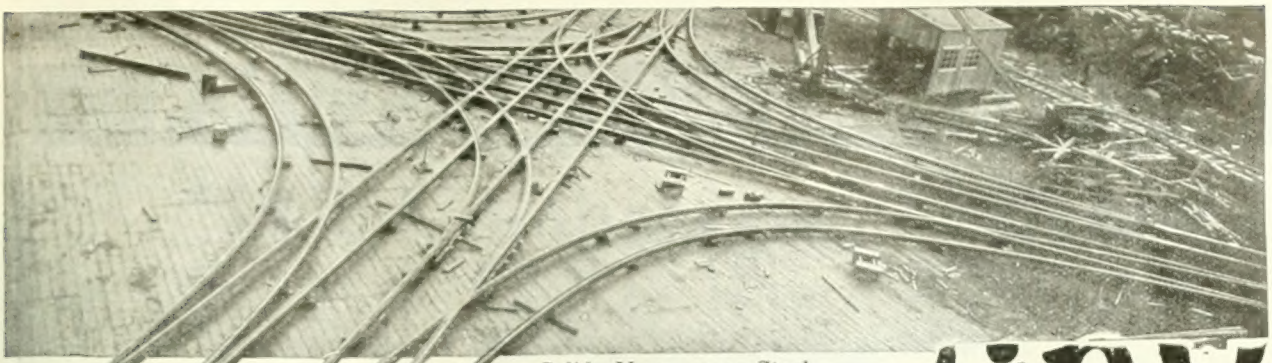
FUSE HOLE GAUGES



Manufacturing and inspection fuse hole gauges for all size shells. A surplus stock enables us to ship immediately.

Windsor Machine & Tool Works

Windsor, Ontario



Solid Manganese Steel Intersection for Montreal Tramways Company.

Steel Castings

For Hydraulic, Mill Gear, Locomotive, Rolling Stock, Marine—in fact we make castings of any size and any kind—Manganese, Vanadium, Titanium, Chrome, Nickel, etc. Dependable products always.

Canadian Steel Foundries, LIMITED
MONTREAL WELLAND

SISCO

We guarantee shipment within 24 hours of receipt of order

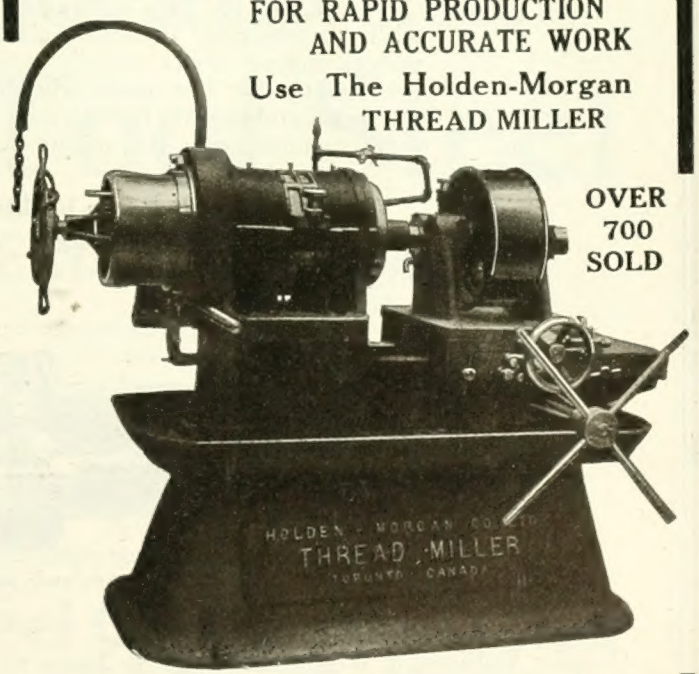
"Extra" "Special" "High Speed" **Tool Steels**

Made in Sweden from selected Dannemora Ore

We also carry in stock Solid and Hollow Drill Steel, Die Blocks, "SISCO" Welding Wire, Drill Rod and Swedish Iron.

Swedish Steel & Importing Co., Ltd.
MONTREAL, QUE.

FOR RAPID PRODUCTION AND ACCURATE WORK
Use The Holden-Morgan THREAD MILLER

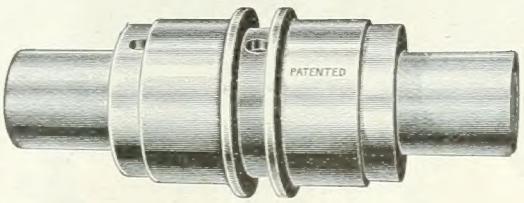


OVER 700 SOLD

Prompt Delivery
On Nose or Base Machines, also Internal or External Fuse Machines—with air-chucks.

The A. R. WILLIAMS MACHINERY COMPANY
LIMITED
64 FRONT ST. W. TORONTO

THE JOHNSON FRICTION CLUTCH



Double Clutch—Exterior.

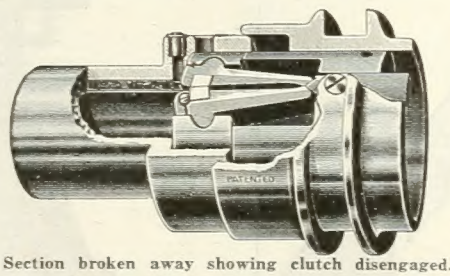
Has But Few Parts Is Very Compact

A body fastened to the shaft carries a split ring in which are inserted a pair of levers. A curve-shaped wedge, which is made part of a shipper sleeve, forces the levers apart, expanding the ring, bringing its outer surface into frictional contact with the inner surface of the friction cup, the hub of which is made to suit requirements.

The leverage is so compounded that it requires but little pressure to operate the Clutch.

One screw which moves two taper blocks, set into the levers, adjusts the contact of the ring and cup to any tension. This is easily reached with a screwdriver through hole in the friction cup. The perfectly smooth shipper sleeve entirely covers the working parts so no dirt can get near them. The double clutch requires but little more space than the single and has two friction cups with hubs, on which can be mounted pulleys, cones, gears, etc., of any diameter and face.

Write for our free booklet—"Clutches as Applied in Machine Building." Also, Yellow Data Sheets



Section broken away showing clutch disengaged.

Canada: Williams & Wilson, Ltd., 320 St. James St., Montreal; Can. Fairbanks-Morse Co., Ltd., Toronto,
England: The Efandem Co., 159 Gt. Portland St., London, W., Sole Agents British Isles.
Australia: Edwin Wood, Pty., Hardware Chambers, 231 Elizabeth St., Melbourne, Victoria.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

We will Fill Your Requirements *Send Us Your Inquiries*

Air Compressor Evidence

The greatest evidence of the value of any article is the demand for it after investigation and trial. Below are four carloads of our compressors which fills one order to a large concern in Canada. Our line of compressors is very large.

Write us and explain your requirements.

The Jenckes Machine Company, Limited

WORKS: Sherbrooke, Que.

CANADIAN SALES OFFICES: Sherbrooke, Montreal St. Catharines, Toronto Cobalt, South Porcupine, Vancouver

WORKS: St. Catharines, Ont

"ULTRA CAPITAL" HIGH SPEED STEEL

Balfour's Tool Steel

"CAPITAL" HIGH SPEED TWIST DRILLS

MANUFACTURED BY

Arthur Balfour & Co., Limited
Dannemora Steel Works,
Sheffield, England.

The Eagle & Globe Steel Company, Limited

Head Office and Warehouse, Canada and U.S. 128 Craig Street West, Montreal
Ontario Office and Warehouse 36 Colborne Street, Toronto
Winnipeg Stock Dominion Equipment & Supply Co. Limited
Vancouver Stock Frank Darling & Co.

W. A. BRADBURY, Agent, 128 Craig Street West, Montreal

If any advertisement interests you, tear it out now and place with letters to be answered.

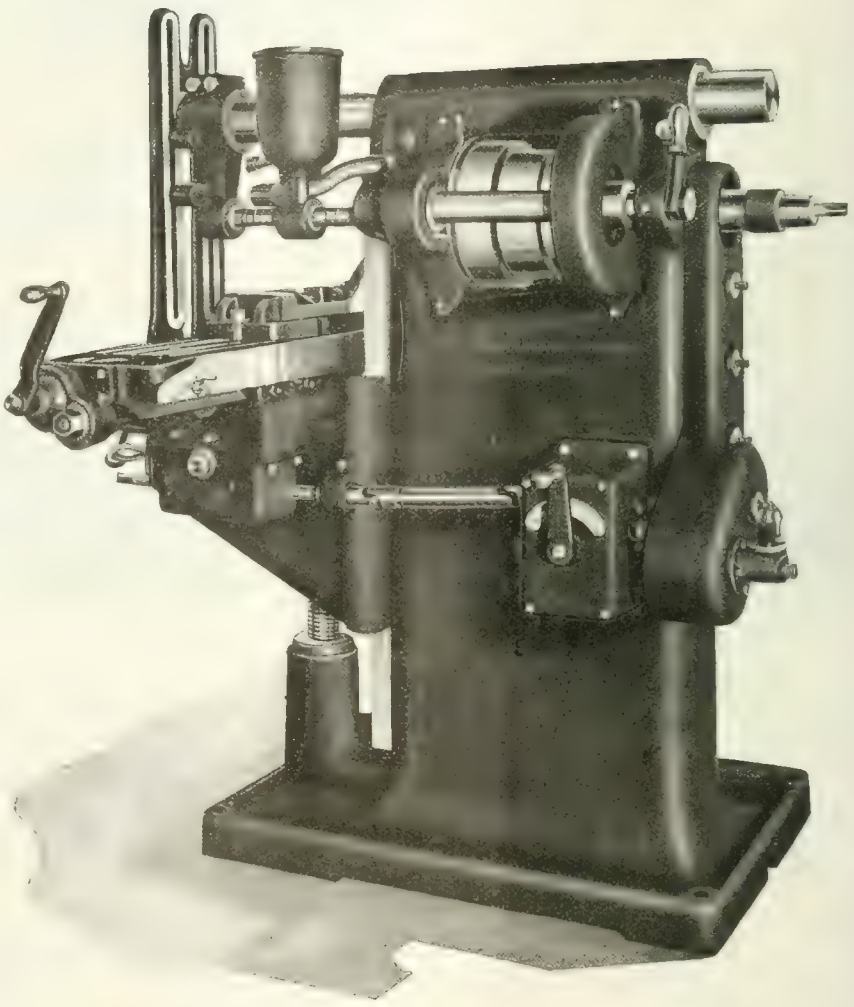
The Ford-Smith Machine Company

Adv't. No. 6

MILLER SERIES

CONFIDENCE:

When an operator starts on any work he likes to feel certain that the machine will do the job, accurately and successfully, not to speak of the fact that the owner wishes it done in the shortest time possible.



Have our advertisements so far shown you that our Millers are so built to accomplish the results just spoken of?

We ourselves feel confident our machines will accomplish their work—because not only is the best of material part of their success—but also the workmanship.

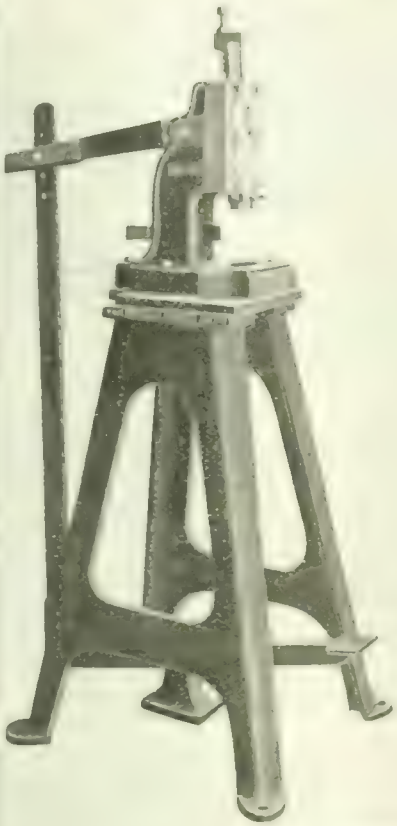
Next Advertisement We Will Tell You Of Our Staff

The Ford-Smith Machine Company, Limited

HAMILTON ONTARIO CANADA

If interested, tear out this page and keep with letters to be answered.

WHY A "B. B.?"

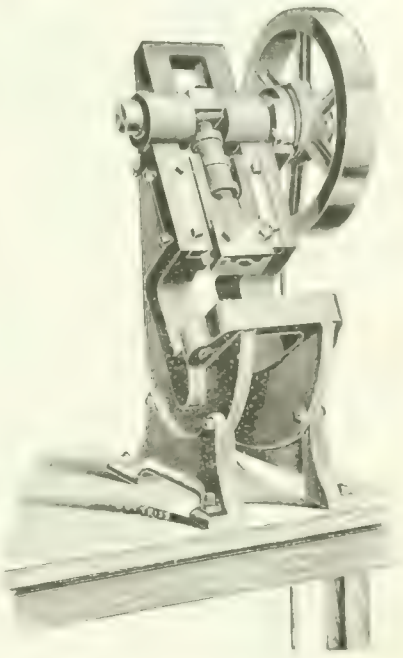


Experience has proved
that

B.B. PRESSES

qualify for

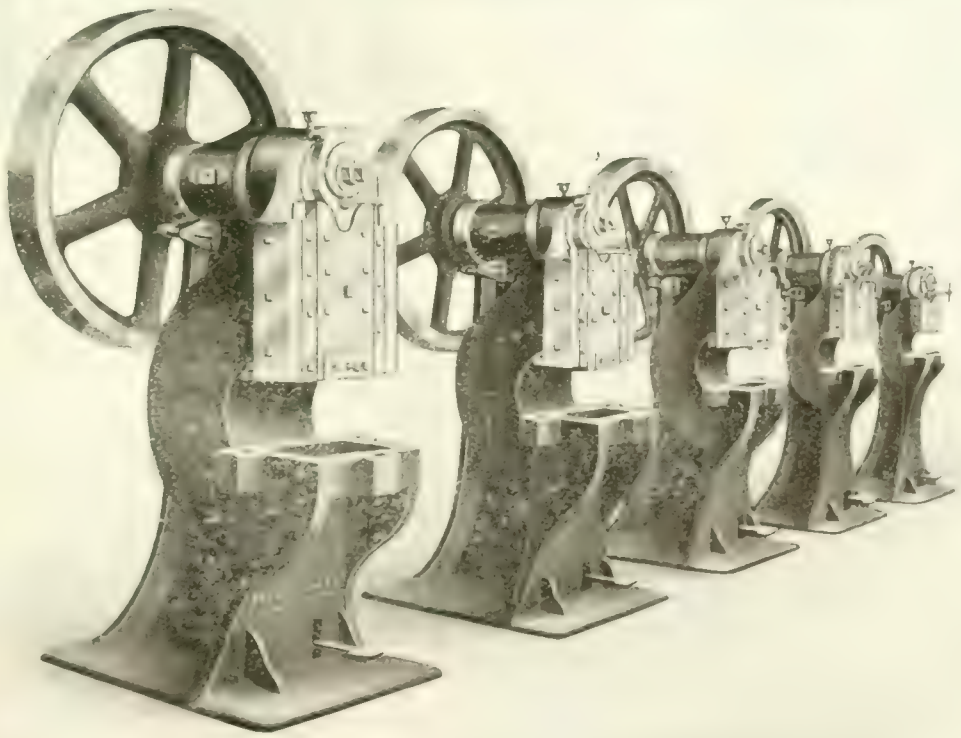
Economy
Durability
Speed



The Brown, Boggs Co.,

LIMITED

HAMILTON, ONT., CANADA



If any advertisement interests you, tear it out now and place with letters to be answered.

OUR Country requires the extreme limit of production from every lathe, planer, miller or other machine tool.

BE PATRIOTIC

"Red Cut Superior"

The Nationally Known
First Quality

HIGH SPEED STEEL

Will enable you greatly
to increase your output

"IT'S THE BEST FOR ALL MACHINE WORK"

VANADIUM-ALLOYS STEEL CO.

PITTSBURGH, PA. Works at LATROBE, PA.

CARRIED IN STOCK AT THESE WAREHOUSES

E. T. WARD & SONS, 44 FARNSWORTH ST, BOSTON, MASS.
GEO. NASH CO, 304 HUDSON ST, NEW YORK, N. Y.
FIELD & CO. INC, 721 ARCH ST, PHILADELPHIA, PA
VANADIUM ALLOYS STEEL CO, PITTSBURGH, PA AND LATROBE, PA
GEO. NASH CO, 646 WASHINGTON BLV'D, CHICAGO, ILL.

WOLFRAM

MADE IN THE U.S.A.

HIGH SPEED STEEL

TRADE MARK

A Keen Cutter

WOLFRAM Is Both

VULCAN CRUCIBLE STEEL CO.
Aliquippa ESTABLISHED 1880 Pa: U.S.A.
Represented in Canada by Massey Norton Callard & Company MONTREAL QUE.

Strong in the Neck

ELECTRITE-URANIUM High-Speed Steel

Will amaze you in its ability to remove metal

The introduction of this rare element—"URANIUM"—into the mixture of our already superb cutting product, has supplied the final perfection of the qualities of toughness and durability which has been the hitherto impossible goal of metallurgical hopes.

Electric Furnaces, Automatically regulated, produce inevitably similar results at every melt.

We are ready to assist your inquiry in every way possible.

Write

Latrobe Electric Steel Company
Latrobe, Pennsylvania

LESCO

One of the

Steels of the Century

Centurion High-Speed

Made from the BEST Materials

Iron, Tungsten, Chrome, Vanadium

Melted by the BEST Process

The Crucible Furnace Method

Handled by the BEST Workmen

Melters, Forgemen, Annealers, Metallurgists

CONSEQUENTLY

Will do the BEST Work

Quality ***Delivery*** ***Service***

We have a catalog waiting for you. Write for it.

THE CENTURY STEEL CO. OF AMERICA

MANUFACTURERS OF HIGH-GRADE CRUCIBLE STEELS

General Office and Works:
POUGHKEEPSIE, N.Y.

Sales Offices:
120 BROADWAY, NEW YORK

DOUBLE

MUSHET

High Speed Steel

Carbon Steel

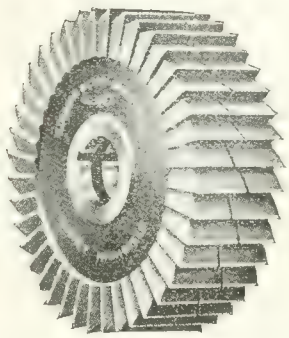
Gauge Steel

Alloy Steels

SOLE MAKERS

Samuel Osborn & Co. Ltd.

SHEFFIELD



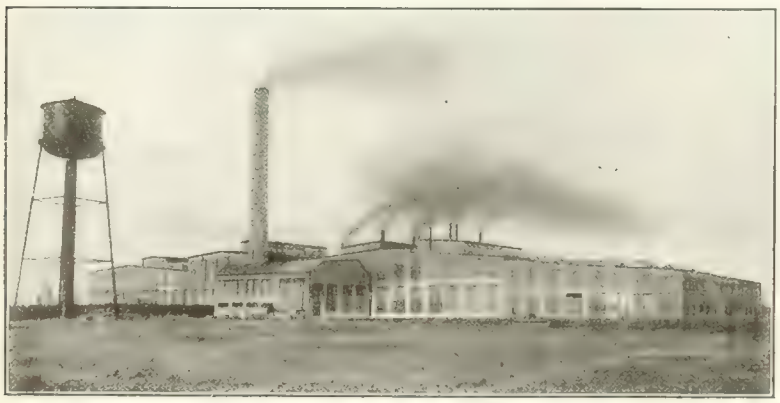
Twist Drills and Reamers, Milling Cutters and Slitting Saws

Sam'l Osborn (Canada)

Limited

Head Office and Works: Montreal, P.Q.

Branch Office: Toronto, Ontario



Works: LONGUEUIL, QUE.

Armstrong, Whitworth of Canada Limited

Standard Sizes of

HIGH SPEED STEEL

Carried in Stock

CARBON AND ALLOY STEELS

Shop Tools, Gauges, etc.

HEAD OFFICE: 298-300 St. James St., Montreal

Branches: Dominion Bank Bldg., TORONTO
27 King William Street, HAMILTON
McArthur Bldg., WINNIPEG, MAN.

Coal
Coke
Iron Ore

Pig Iron

Victoria FOUNDRY & MALLEABLE

Made by The Canadian Furnace Co.
Port Colborne, Ontario, Canada.

M.A. HANNA & CO.

Sales Agents, CLEVELAND

Canadian Office:

703 C.P.R. Bldg., Toronto

TRADE MARK

of the Famous

"WACO"

BRAND

HIGH SPEED STEEL

AND

TWIST DRILLS

"DOUBLE WACO" Quality

Specially Adapted for Munition Work

"TURTLE" BRAND

High Class Tool Steel, Files, etc., of all descriptions.

ESTABLISHED 1870

WM. ATKINS & CO., LTD.

TRADE MARK "WACO"

Reliance Steel Works

SHEFFIELD, ENG.

TRADE MARK

For particulars apply to our

Sole Representatives for Canada

GEO. A. MARSHALL & CO.

70 Lombard Street Toronto, Ontario

STEEL

FOR SHRAPNEL SHELLS AND SHELL BLANKS

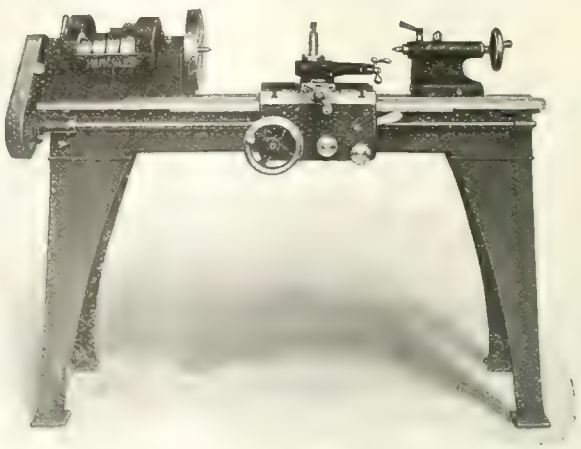
We are the only company in Canada producing steel ingots by the "HARMET" Liquid Process, a process that makes these ingots vastly superior to the ordinary kind, improving the physical properties and reducing the waste of ingot.

We can supply forgings of all shapes and sizes made of ordinary or "HARMET" Fluid Compressed Open-Hearth Steel on the Shortest Notice.'

Nova Scotia Steel and Coal Company
Limited

Head Office: NEW GLASGOW, N.S.

Western Sales Office:
Room 14, Windsor Hotel, MONTREAL



LATHES

12", 16", 18" and 21" swing

Strictly modern in design, rigidity and accuracy guaranteed.

Himoff Machine Company
45 Mills Street
Astoria, City of New York, N.Y.

The Heat in Your Steam Condensation

What Are You Doing With It?

A big *economy* or a big *waste?*
A big *saving* or a big *loss?*
Which is it in your plant?

Are you returning the condensation in your steam lines *immediately* back to the boilers as pure hot feed water—or are you allowing it to clog up your apparatus and slow down the operation of your plant.

The thousands of concerns—both large and small—who use the

Morehead Back to Boiler SYSTEM

turn the water of condensation right back to the boilers at from 270 to 312 Degrees F.—save from 8% to 10% in coal over the wasteful steam pump—and at the same time keep every inch of heating surface on their equipment working at the highest possible thermal efficiency.

If you are still depending upon steam pumps or other makeshifts for handling the condensation in your plant you can convert a big loss into a big saving by investigating the Morehead System at once. For complete particulars address.

CANADIAN MOREHEAD MFG., CO.
Dept. "L"
WOODSTOCK, ONTARIO

QUITE remarkable economies have been effected in turning, planing and shaper work on all kinds of steel, cast iron, bronze and other materials by the new alloy

STELLITE

But we are now able to recommend it for Milling Cutters and Form Tools of all kinds.

Information and quotations supplied by our Service Department on application.

Deloro Smelting & Refining Co. Ltd.

Head Office & Works—Deloro, Ont.

TORONTO
200 King St. W.

MONTREAL
315 Craig St. W.

If any advertisement interests you, tear it out now and place with letters to be answered.

What is there about a CISCO LATHE you do not like?

We are very willing at any time to receive suggestions or criticisms on

THE LATHE WITH THE PULL
THE LATHE OF SIMPLIFIED ACCURACY

from anyone, and though to-day, we feel we have one of the best machines manufactured we are constantly adding some new little feature, such as shear wipers, etc., in order to keep pleased

Cisco's Many Pleased Customers

So, come along; let us hear from you. We will take it kindly. And by the way, have you seen in operation one of our

NEW CISCO 24" LATHES

Oh, but it's a bull. Never so much power, in any lathe built, and lake all other Ciscos it's just as

Simple in Operation, Accurate and Efficient

SOLD IN CANADA BY
THE
A. R. Williams Machinery Co., Ltd.

MADE IN CINCINNATI, U.S.A. BY
The Cincinnati Iron & Steel Company
14-in., 16-in., 18-in., 24-in. Lathes

Improved Centering Machine

Mr. Shell Manufacturer:

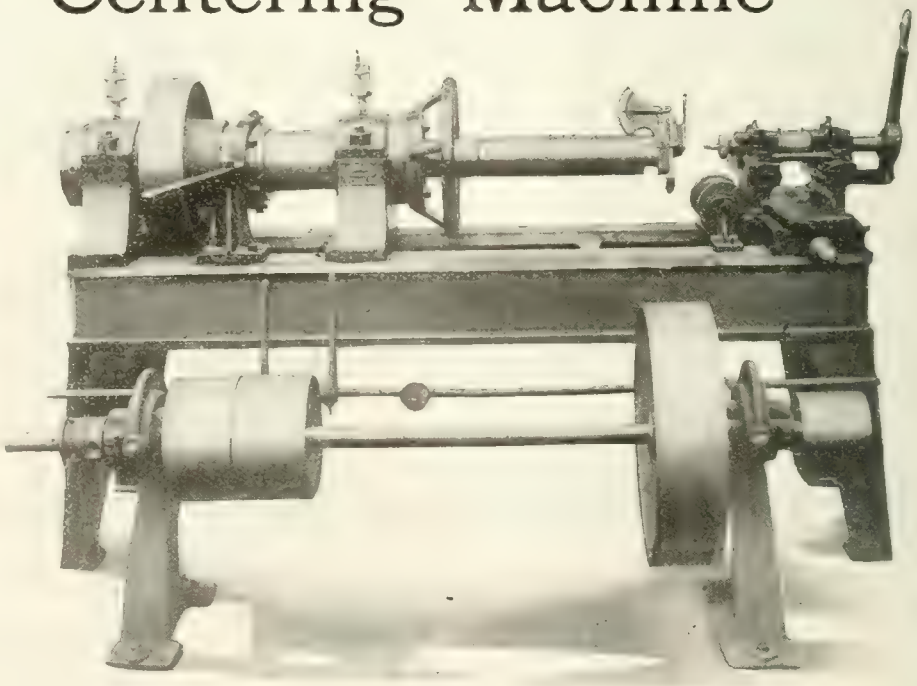
The importance of centering is obvious.

This tool is giving real satisfaction every day and stays on the job.

Write for price and description.

Delivery, ship 10 days after order.

Shipping weight 2040 pounds.



VICTORIA FOUNDRY COMPANY, LIMITED
OTTAWA, ONTARIO

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.

Roelofson 6-in. Banding Machine

You couldn't imagine a more sturdy, compact, serviceable machine than this! A glance at the illustration will show you for yourself. It has been used in Canadian munition plants since the munition business started, and is still giving absolute satisfaction. It's the machine you need if you make shells.

Look over the following outstanding features of its construction:

Integral (en bloc) construction assures perfect rigidity, permanent accuracy and desirable compactness.

Chucking with spring collet chuck insures accurate and speedy checking.

Graduated feed dial, two cutting tools, and ample belt power insure output of accurate work in least possible time.

Machines are built for 15, 18, 60-pdr. and 6" shells.

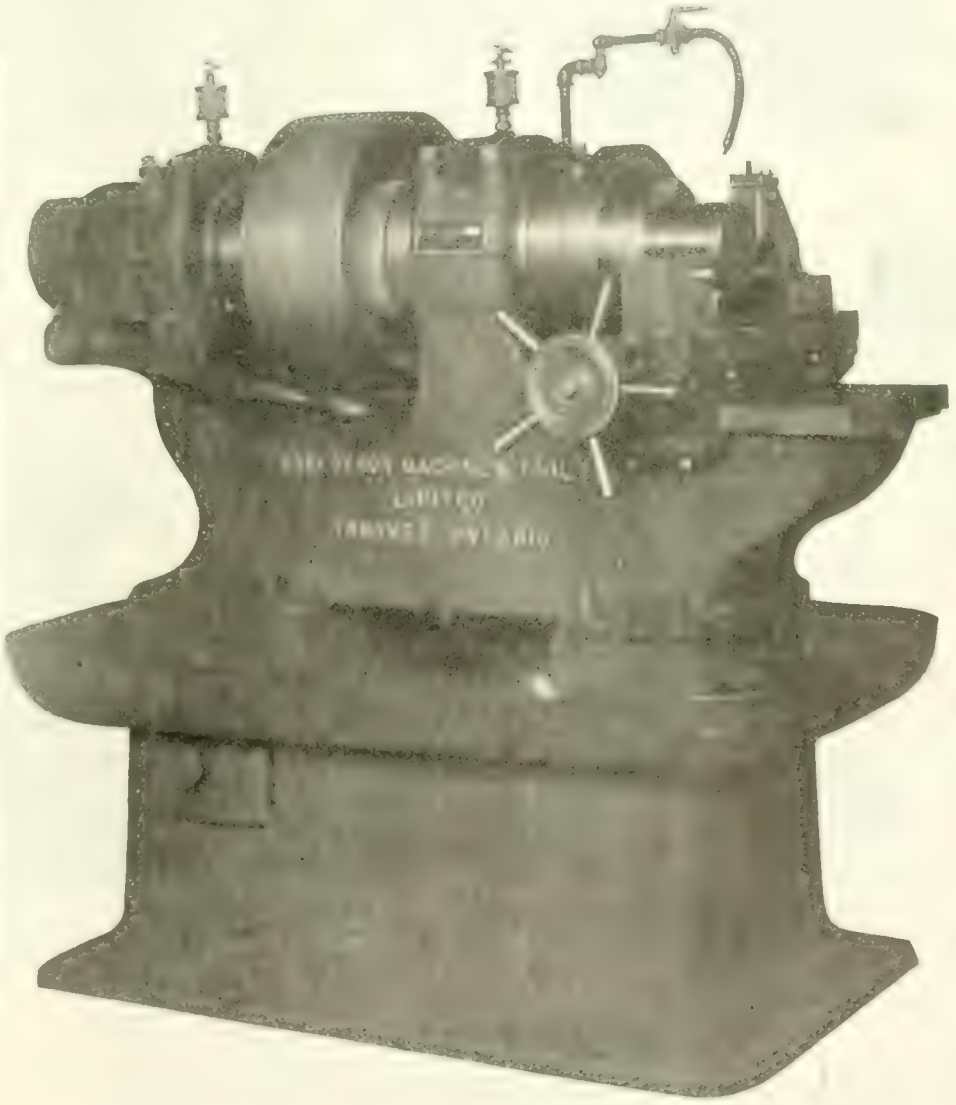
Roelofson Machine & Tool Co., Ltd.

Head Office: 1501 Royal Bank Building, Toronto, Canada
Works and Warehouse: Galt, Ont., Canada

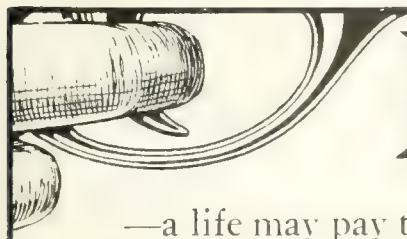
Immediate Delivery

To shell plants changing over from the manufacture of the larger sizes to 6" shells, our ability to make **immediate delivery** should be of especial interest.

And remember that the Roelofson is one of the few banding machines that have stood up from the first of the munition game and are still doing duty.



If any advertisement interests you, tear it out now and place with letters to be answered.



IF ..the finger on the trigger wabbles.....

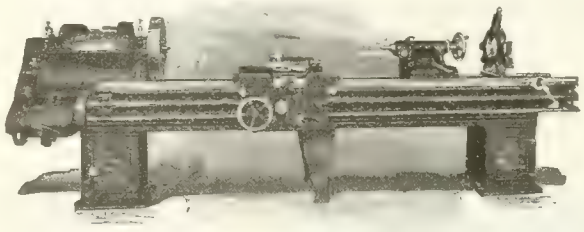
—a life may pay the final penalty. Steady nerves win the battles of life.

"Sidney for Service" lathes are built with steady nerves—they don't chatter and wabble under heavy duty.

A lathe that does not permit absolutely accurate work is dangerous. A lathe that wabbles is as great a menace to life as a finger that wabbles when on the trigger.

The "Sidney-for-Service" construction assures a machine that stands as firm as Gibraltar. Drop a line to our nearest agent in Canada, or write to us for Bulletin 30.

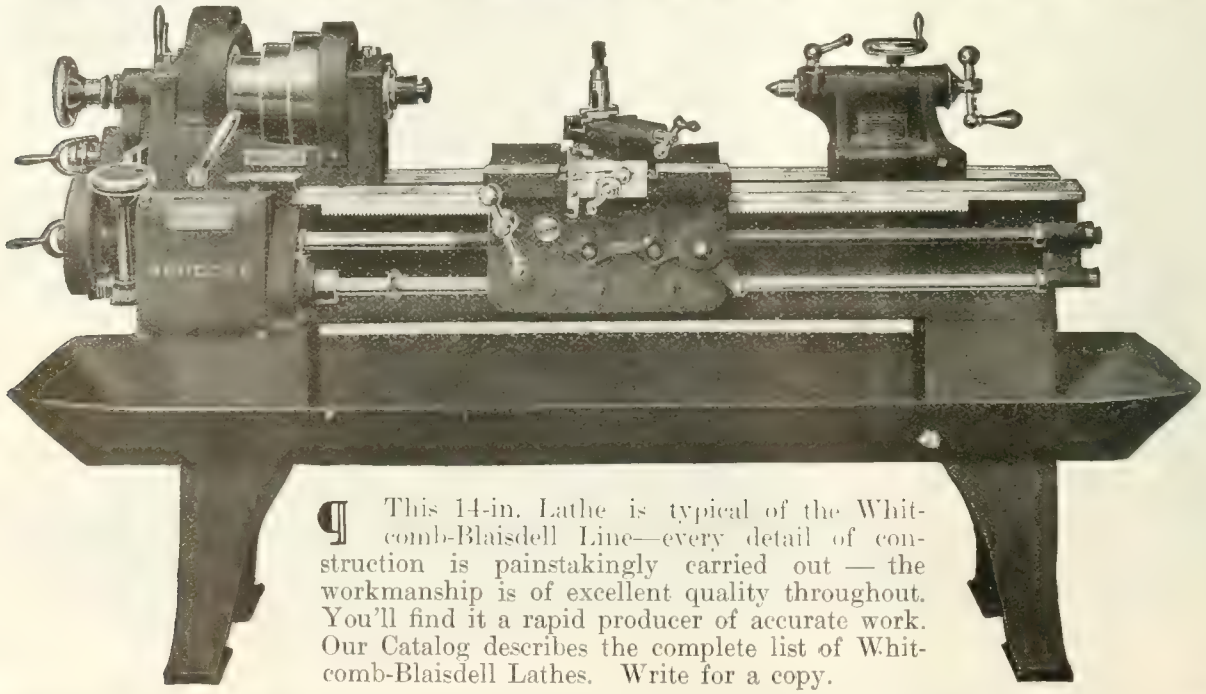
SIDNEY for SERVICE



FOSS & HILL MACHINERY CO.,
MONTREAL, QUEBEC
H. W. PETRIE, LIMITED
TORONTO, ONTARIO

THE SIDNEY TOOL CO.,
SIDNEY, OHIO, U.S.A.

Whitcomb-Blaisdell Lathes



¶ This 14-in. Lathe is typical of the Whitcomb-Blaisdell Line—every detail of construction is painstakingly carried out — the workmanship is of excellent quality throughout. You'll find it a rapid producer of accurate work. Our Catalog describes the complete list of Whitcomb-Blaisdell Lathes. Write for a copy.

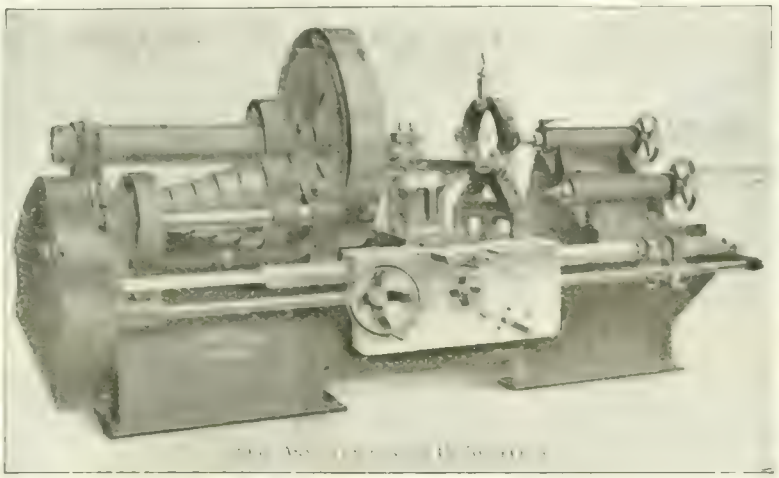
The Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass.

IMMEDIATE SHIPMENT

30-ft. BED
McCabe 2-in-1 Lathe

26 and 48-INCH SWING
TRIPLE-GEARED—RATIO 72 to 1

J. J. McCabe, 149 Broadway New York



Showing McCabe's Latest Heavy Type "2-in-1" Double-spindle Lathe—26 48-in. Swing.

48-in. Swing Triple Geared—ratio 72 to 1.

26-in. Swing Back geared.

Turns between centers—24 ft.

Swing over carriage on 48-in. Lathe is 40 in.

Prominent shipbuilders are using McCabe Lathes on long beds.

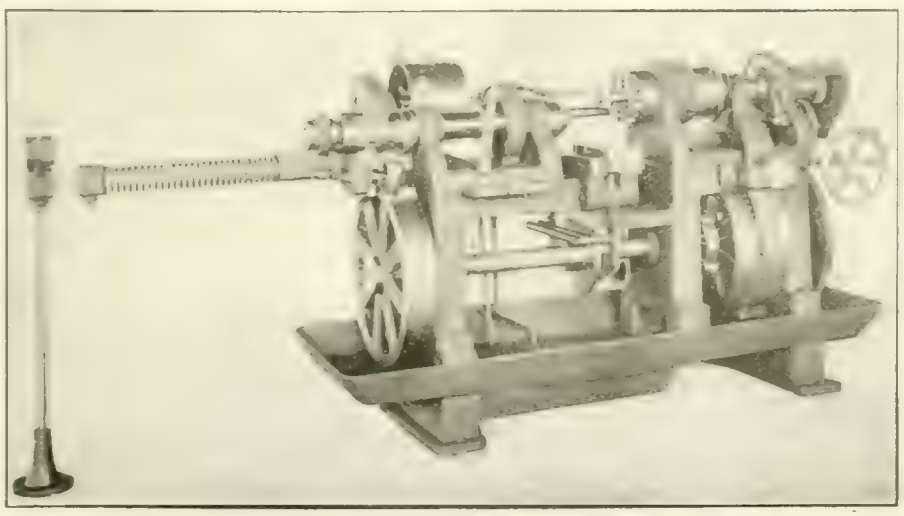
Thousands in operation all over the world.

Power is Costly--- Don't Waste It

John MacNab Machinery Co.
90 West St., New York
John MacNab, Hyde, England

A STRIKING feature of the Chicago Automatic is the 100 per cent. utilization of power. Operated by a single belt run direct from the lineshaft, troublesome overhead belting and countershafts, with the power they waste, are eliminated, making it easy to install one or a battery of these machines.

Equally as important is the general simplicity of construction; there is no reversing or belt shifting, no complicated mechanisms, and all parts are readily accessible. Action is positive, results unvaryingly uniform and accurate. The machine is extremely well built in every particular and produces fine work at very low costs. Made in ¾", 1¼", 1½", 2" sizes. Catalog for full particulars.



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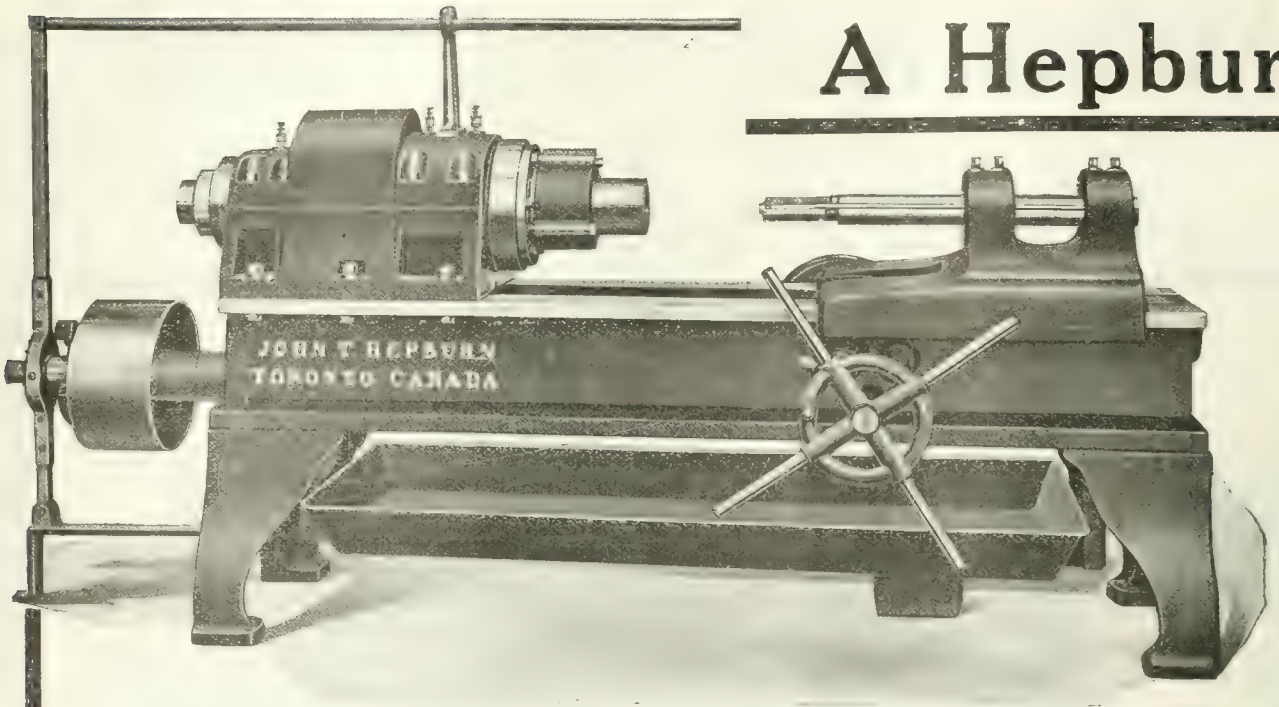
A Hepburn



This HEPBURN Single Bar Boring Lathe's rigid construction has proven it to be the **BEST 6″ BORING LATHE** procurable.

The HEPBURN NEW STYLE NOSE BORING AND INSIDE PROFILE LATHE is the last word in machine design for these operations.

We can convert your old turrets or other lathes into these up-to-date machines.

We make Lathes for all operations on shells.

John T. Hepburn, Limited
18-60 Van Horne St., TORONTO, ONTARIO

THE FINAL TEST IS PRODUCTION

and that is the reason why the demand for the

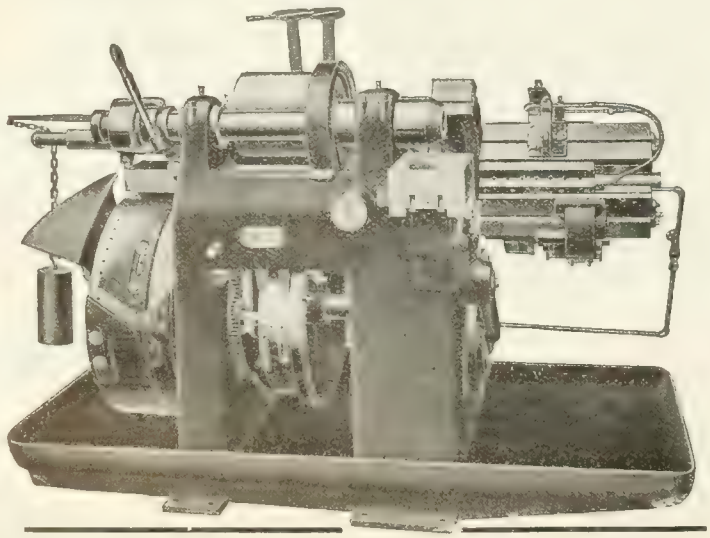
GRIDLEY AUTOMATIC TURRET LATHE

has constantly increased; for Gridleys are *producing*—not only those recently built but those first put in use.

Gridley production has been the kind that every manufacturer wants, viz.—accurate—rapid—uniform—economical.

Why not let us tell you about Gridley production on your turret lathe work?

Send Sample or Blue Print for quotation.

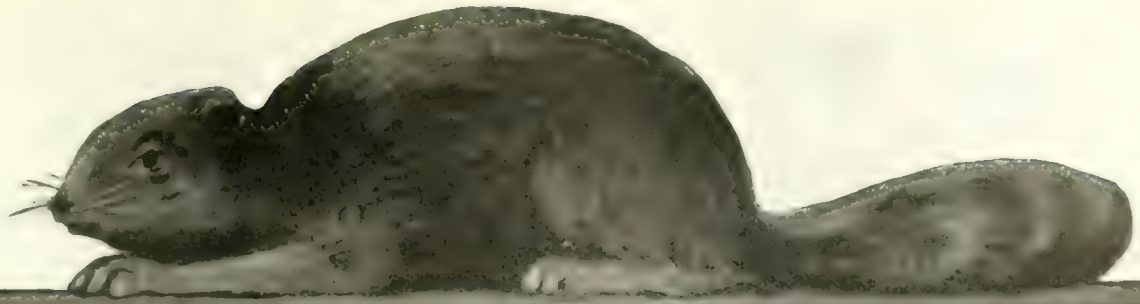


GRIDLEY AUTOMATIC TURRET LATHE
Chuck Capacities up to 5 in.
for Bar or Single-piece Chucking Work.

THE
NATIONAL ACME COMPANY
WINDSOR, VERMONT
GENERAL OFFICES, CLEVELAND, O.
CANADIAN SCREW PLANT, MONTREAL, P. Q.

Branch Offices: New York, Boston, Chicago, Detroit, Atlanta, San Francisco. Warehouses: New York and Chicago. Representatives in Foreign Countries.

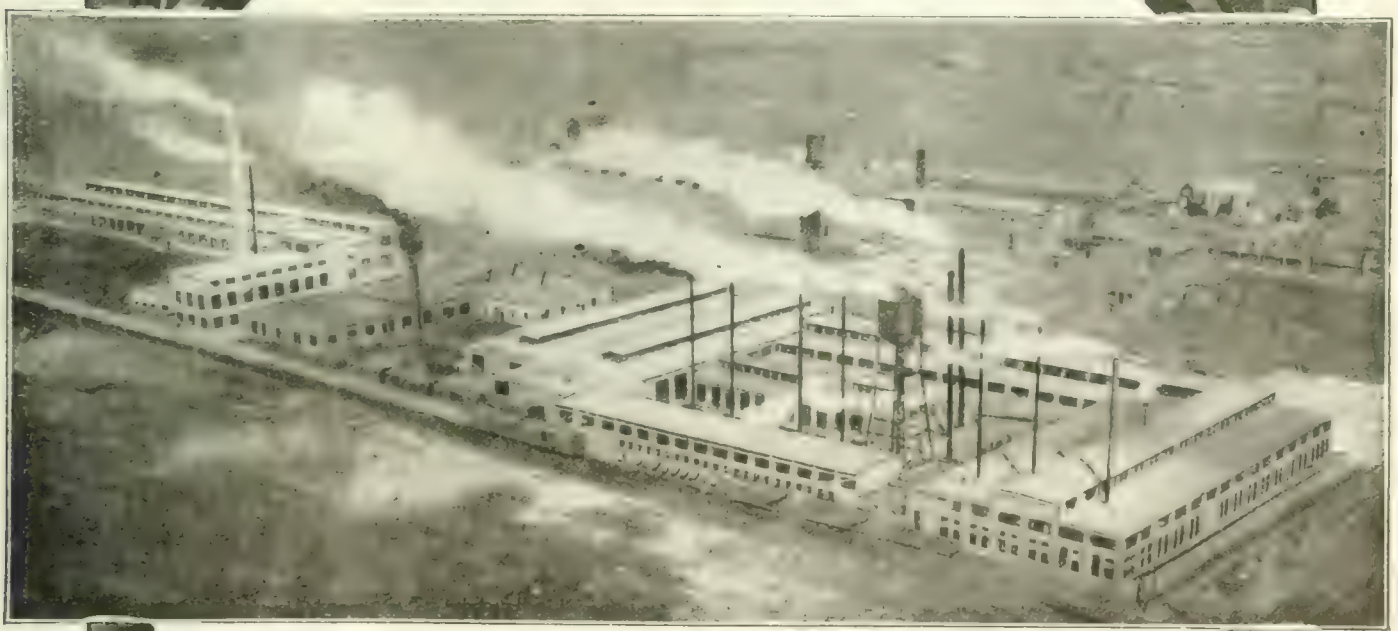
Makers of Gridley Single and Multiple-Spindle Automatics at Windsor, Vermont, and Acme Automatics, Threading Dies, and Screw Machine Products at Cleveland, Ohio



BROWN'S

BEAVER BRAND METALS

BRASS, BRONZE,
CANADA SILVER and GILDING METAL
In Sheets, Rolls, Plates and Rods



Brown's Copper & Brass Rolling Mills, Limited

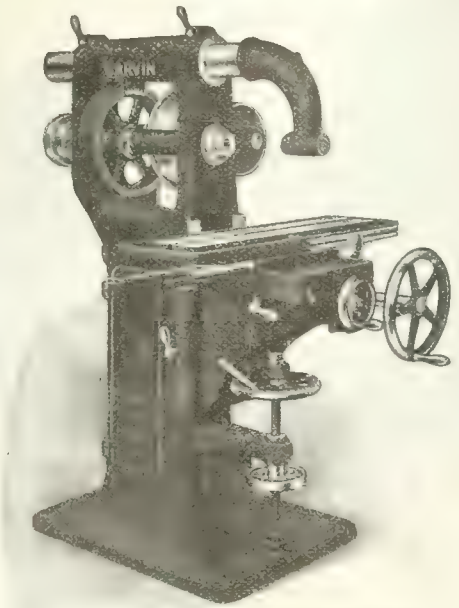
General Offices and Works:
New Toronto, Ontario, Canada

COPPER & BRASS
BROWN'S
QUALITY
ROLLING MILLS

If any advertisement interests you, tear it out now and place with letters to be answered.

GARVIN No. 21 Plain Miller

Back Geared



No. 21 B.G. PLAIN MILLING MACHINE
Back Geared
Use Code - Abject

For Plain and Gang Milling for general manufacturing, and is used mostly in gangs of 5 or 6 machines to one operator. Spindle runs in adjustable bronze boxes, and is driven by a 3" belt through back gears (3 to 1).

Knee is our improved solid top design, rigid and stiff to resist side pressure of heavy cuts.

DIMENSIONS:

Automatic Feed at Table	18 in.
Adjustment in line with Spindle	6 in.
Vertical adjustment under Spindle	13 in.
Table, inside Oil Pockets	6 x 10 in.
Ranges of Speed	6
Changes of Feed	6
Net Weight, Skidded	1,575 lbs.

For Further Information { ASK YOUR DEALER or WRITE US DIRECT

IMMEDIATE DELIVERIES

Send for Complete Catalog

MANUFACTURED BY

THE GARVIN MACHINE COMPANY

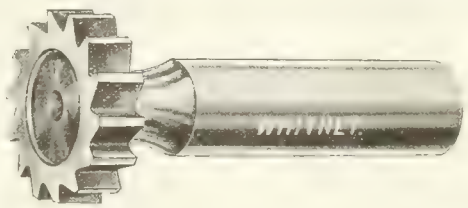
Spring and Varick Streets (*Visitors Welcome*) 50 Years New York City

"WHITNEY"

KEY-SEAT CUTTERS

For the Woodruff System of Keying

GET OUR PRICES



Either carbon or high-speed steel.
Material the best obtainable.
Unsurpassed in efficiency and durability.
Centred at both ends.
Unsurpassed in accuracy and finish.
Large quantities carried in stock.

The Whitney Mfg. Co., Hartford Conn.

Chains, Keys and Cutters, Hand Milling Machines

For Rapid Production and Accurate Work

USE THE

"BRIGGS"

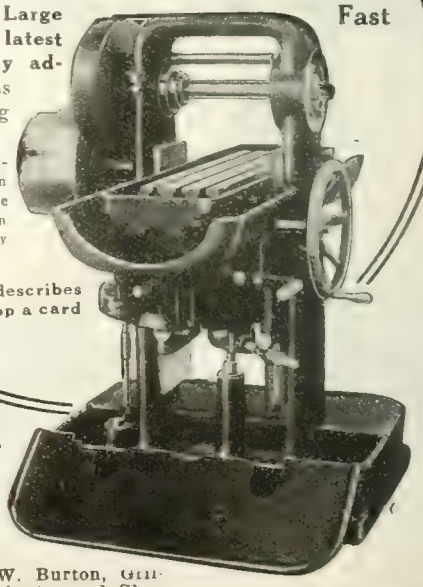
The Briggs Miller handles work no other machine of its size can touch. It is a manufacturing machine. On account of its rigid construction it will produce accurate work when running at a high rate of speed and feed.

The Base Tank and Large Gear Pump is the latest addition to its many advantages. Tank holds 20 gallons of cutting lubricant

Pump never requires priming and will deliver ten gallons per minute to the cutters, keeping them cool when run at very high speed.

Our booklet describes fully. Drop a card for it.

Fast



Gooley & Edlund Inc.
Cortland, N.Y., U.S.A

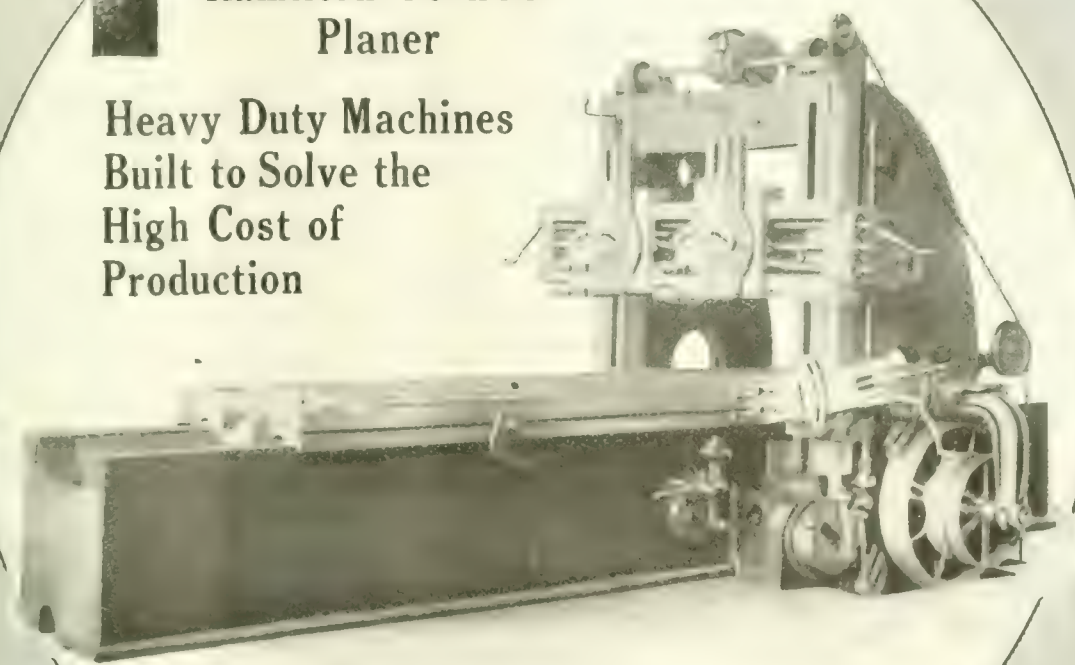
Foreign Agents: Allied America, France, Belgium, Italy, Switzerland, Machinery Company of Russia, Scandinavia, C. W. Burton, Griffiths & Co., London, Manchester and Glasgow, Barandiaran, Metivier, Gazeau & Cia, San Sebastian, Spain.

HAMILTON

PLANERS

Hamilton 36" x 36" Planer

Heavy Duty Machines Built to Solve the High Cost of Production



WEIGHT, RIGIDITY, DIMENSIONS and POWER—these are the combination of assets that give exceptional productive ability to "HAMILTON" PLANERS

The installation of the "HAMILTON" strikes a crushing blow at the High Cost of Production. They do big work fast and accurately. Sizes from 21" x 21" to 54" x 54".

Our bulletin will tell you all about this planer. Give us your address

The Hamilton Machine Tool Company, Hamilton, Ohio

H. W. PETRIE, LIMITED, TORONTO, Sole Agents for Ontario.

If any advertisement interests you, tear it out now and place with letters to be answered.

Consolidated Presses

appeal to discriminating users because of the massive construction of all working parts, the generous crank shaft bearings, the increased diameter of crank pins, liberal crank cheeks, long and carefully fitted slide bearings, abnormally large connection screws, powerful gearing, and above all, the skill and care exercised in their construction.

These are features which should be considered when purchasing.

Consolidated Press Company

HASTINGS *LARGEST EXCLUSIVE MANUFACTURERS OF POWER PRESSES IN U.S.A.* MICHIGAN

Canadian Representatives: A. R. WILLIAMS MACHINERY CO., Limited, Toronto, St. John, Winnipeg, Vancouver

Speed

When the quality of the work is the best obtainable, the next item is speed. For upon speed depends your costs. One rivet per second is the speed this machine will maintain indefinitely. Adapt that speed to your requirements and find out the value the Grant Riveter would be to you.

Write for our catalogue. It will give you complete information.

Grant Mfg. & Machine Company

Bridgeport, Conn., U.S.A.

Triple Purpose

"METALWOOD" COMBINATION

Forcing, Broaching and Straightening Press.

Its value is in the many uses to which it is adaptable. Auxiliary tables and fixtures add greatly to its usefulness. It is not "encumbered" with a single excess part. Built for production.

Metalwood Mfg. Co.

Leib & Wight Sts., DETROIT, MICH. U.S.A.

For Great Britain and Continent address Gaston E. Marbaix, Coronation House, 4 Lloyds Ave., London, E.C., England.

Bilton Automatic Gear Millers—Spur or Bevel Gears

CAPACITY

No. 1 - 14 Pitch
No. 2 - 10 Pitch
No. 3 - 5 Pitch

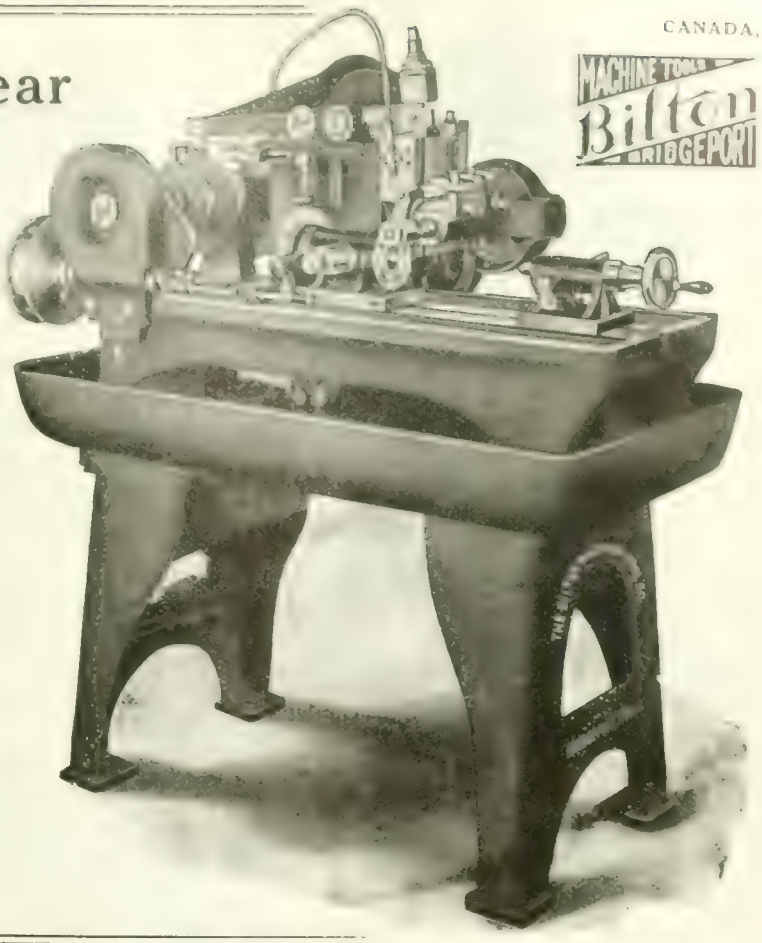
The Bilton Machine Tool Company

Succeeding The Standard Mfg. Company
Housatonic Ave., Bridgeport, Conn., U.S.A.

Also Manufacturers of :—
Plain Horizontal Millers
Automatic Millers
Plain and Ball Bearing
Bench and Column Drills
Milling Cutters
Riveting Machines

Catalog 30 on request

Foreign Agents :
Alfred Herbert, Limited
M. Mett Engineering Company
Chas. Churchill Company, Limited

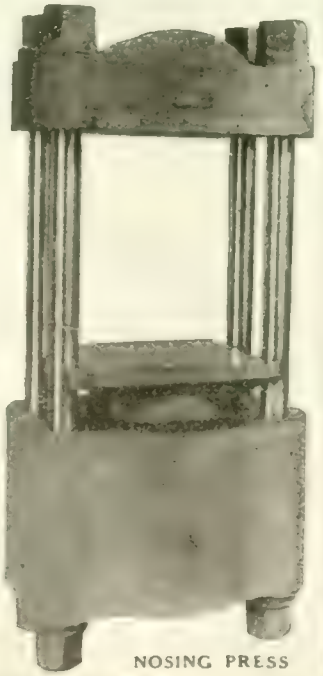


PRESSES

Pumps and Accumulators

FOR ALL PURPOSES

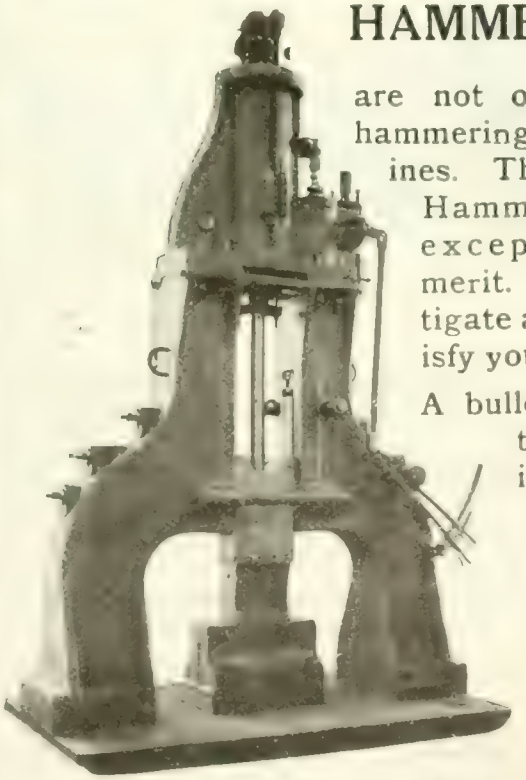
Made in Canada



NOSING PRESS

WILLIAM R. PERRIN, Limited
TORONTO

"ERIE" STEAM FORGING HAMMERS

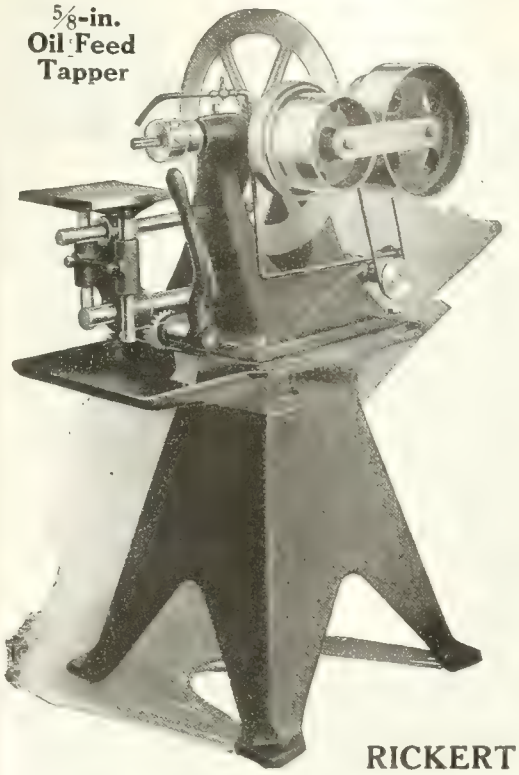


are not ordinary hammering machines. They are Hammers of exceptional merit. Investigate and satisfy yourself.

A bulletin for the asking.

ERIE FOUNDRY COMPANY
ERIE, PENNSYLVANIA, U. S. A.

5/8-in. Oil Feed Tapper



This 5/8" Oil Feed Tapper is featured by the continuous oil feed, which allows greater speed, increased efficiency and output, and longer life.

THE RELIABLE

RICKERT-SHAFER TAPPERS

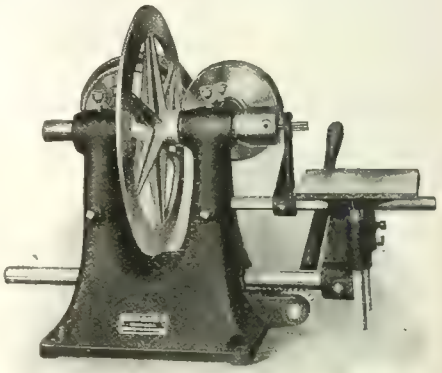
Speed, Accuracy and Minimum Breakage

These are outstanding results in shops that have installed R-S Tappers.

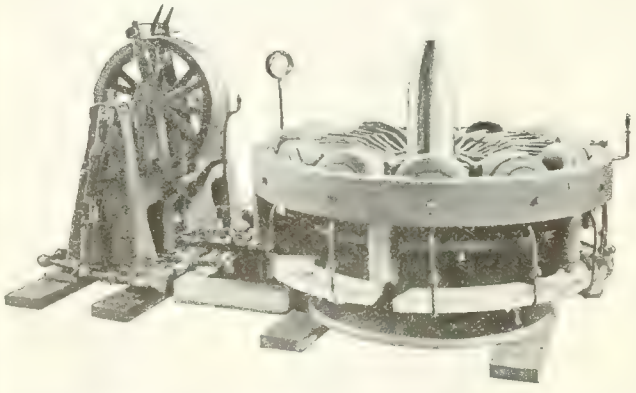
R-S range of Tappers permit of all kinds of work from 3-16" to 5/8". Made in bench, vertical and horizontal designs.

Pleased to tell you all about them. Write.

RICKERT - SHAFER COMPANY
ERIE, PA., U. S. A.
This is Our Address—How Can We Serve You?
ALFRED HERBERT, Foreign Agent.
COVENTRY, ENGLAND



Bench Tapper



The New "West" Banding Press

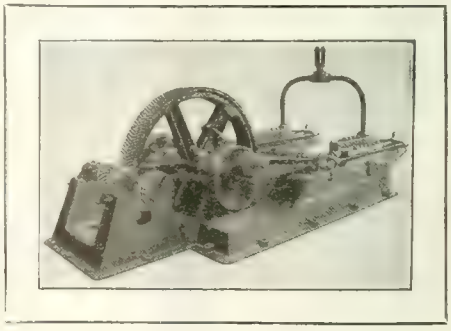
For 9.2" and 8" shells

12 Cylinders; Ample Power; Ample Strength; Reasonable Price.

NO ACCUMULATOR REQUIRED.

The West Tire Setter Co.

255 Mill Street, Rochester, N.Y.



ELMES

18" Stroke Hydraulic Pump

for maximum pressures and capacities, for 250 horse-power motor—a pump designed to meet the demand for a high-pressure outfit of large capacity, and one able to withstand the severe usage of present-day practice.

Other designs for all pressures and capacities.

Charles F. Elmes Engineering Works

217 No. Morgan Street CHICAGO, ILL.

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.

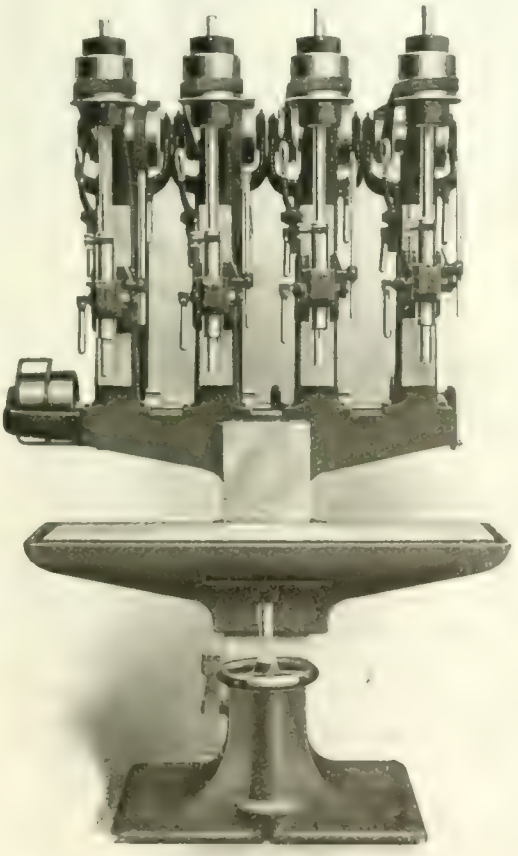
REED-PRENTICE COMPANY

R-P ©

WORCESTER MASS. U.S.A.

THIS REED-PRENTICE IS EQUIPPED WITH BALL BEARINGS THROUGHOUT—RUNS WITHOUT VIBRATION—ALL PULLEYS ARE SUPPORTED AT BOTH ENDS OF HUB—AND CONVENIENT HANDLES ARE PROVIDED BY WHICH THE HORIZONTAL AND VERTICAL BELTS ARE ADJUSTED SIMULTANEOUSLY WITH EQUAL TENSION.

IMMEDIATE DELIVERY ON THREE AND FOUR SPINDLE MACHINES.



CANADIAN FAIRBANKS-MORSE COMPANY, LIMITED

Manning, Maxwell & Moore, Inc., New York

Allied Machinery Co., of America, Paris

Fenwick Freres, Paris

If any advertisement interests you, tear it out now and place with letters to be answered.

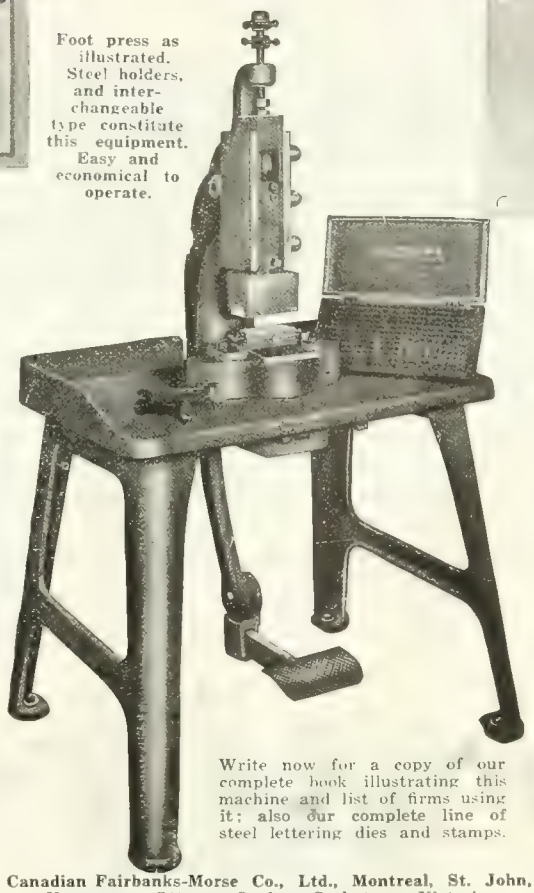
Assure the Safe Arrival of Your Shipments

Rapidly embosses names, addresses, weight numbers, order numbers, etc., on tin or zinc tags of various sizes, quickly making any change in reading matter desired.

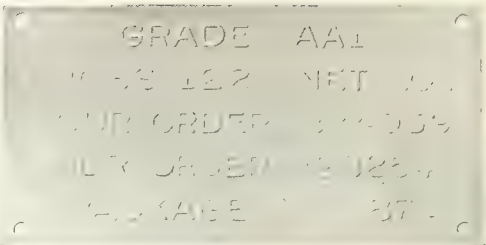
Used by a number of manufacturers who believe it desirable to use metal tags in place of linen tags for labeling, identifying and addressing export or domestic shipments.

Established 1850
Jas. H. Matthews & Co.
Marking Devices
Pittsburgh, Pa., U.S.A.

Foot press as illustrated. Steel holders, and interchangeable type constitute this equipment. Easy and economical to operate.



Write now for a copy of our complete book illustrating this machine and list of firms using it; also our complete line of steel lettering dies and stamps.



Just What You Need For Export Shipments

Metal tags are naturally more durable than linen and not as easily lost in transit—then again they are just as cheap as linen tags in the long run.

Any inexperienced boy can quickly learn to operate this machine and make the necessary tags for your shipments. Further particulars gladly furnished on request.

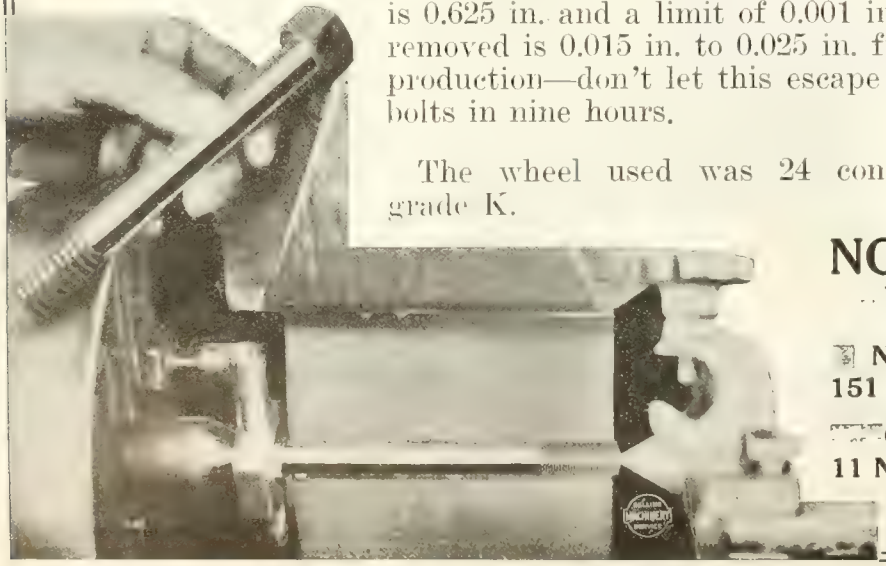
Established 1850
Jas. H. Matthews & Co.
Marking Devices
Pittsburgh, Pa., U.S.A.

Distributors for Canada: The Canadian Fairbanks-Morse Co., Ltd., Montreal, St. John, Toronto, Winnipeg, Calgary, Vancouver, Ottawa, Quebec, Saskatoon, Victoria.

Grinding Operation on Front Axle Spindle Bolts

An interesting grinding operation in a large plant for manufacturing automobile parts in which accuracy is combined with good production is the grinding operation on front axle spindle bolts. The bolts are 6 in. long under the head, threaded 1½ in. long at one end, material steel, case-hardened. The diameter is 0.625 in. and a limit of 0.001 in. is allowed. Stock removed is 0.015 in. to 0.025 in. from diameter. And production—don't let this escape you—is 480 spindle bolts in nine hours.

The wheel used was 24 combination Alundum, grade K.



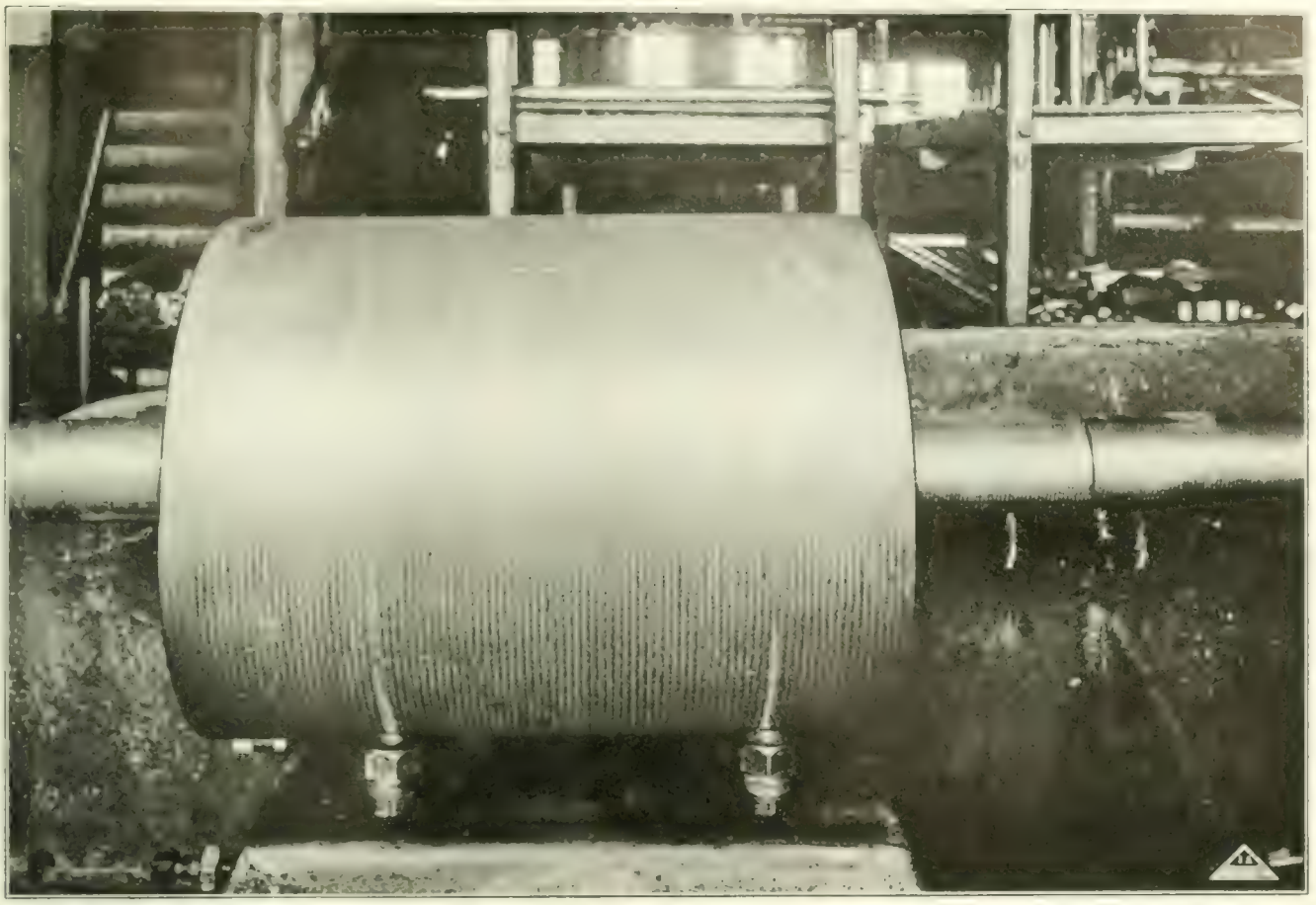
NORTON COMPANY
WORCESTER - MASS.

New York Store
151 Chambers Street

Chicago Store
11 N. Jefferson Street

NORTON

852



Grind Wherever and Whenever You Can

The Norton Grinding Machine will cut your costs and production time.

You wouldn't think of performing rough cuts of coarse feeds and high speeds on the ordinary grinding machine. You would do it on the lathe instead. But why do it on a lathe when you can get much better results in the Norton way? The Norton Grinding Machine will do everything but extremely heavy and rough work.

The illustration shows a rough turned roll 2′ 9½″ over all, with a 12″ body and 2⅜″ shaft. In 45 minutes 1.64 of stock was removed from the diameter.

Interesting, isn't it? We have many more such cases to tell you about. May we?

NORTON GRINDING COMPANY

WORCESTER, MASSACHUSETTS, U.S.A.

Canadian Sales Agents: THE CANADIAN FAIRBANKS-MORSE COMPANY, LIMITED

St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Saskatoon, Calgary, Vancouver, Victoria

521N

If any advertisement interests you, tear it out now and place with letters to be answered.

Die and Holder

THE DIE

Let the ACORN DIE Cut Your Threads

The adjustment is mechanically perfect—simply turn the cap and all the prongs of the die converge equally—a great advantage over the spring die.

The Acorn Die Holder is smaller in diameter than any other die holder of equal cutting size.

The float permits the die to follow its own lead.

The die projects slightly beyond the adjusting cap, making it admirably adapted for shoulder work—and the chips are thrown ahead of the work, so the die does not clog.

Will you try the Acorn Die on your own work—under your own conditions?

WELLS BROTHERS COMPANY OF CANADA, Limited

GALT - ONTARIO

SALES AGENTS: The Canadian Fairbanks-Morse Company, Limited, Montreal, Toronto, Vancouver, Winnipeg, St. John, Calgary

TRADITION

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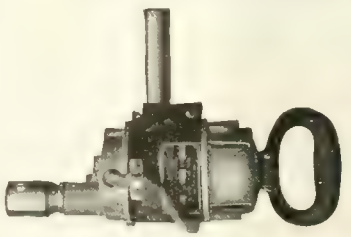

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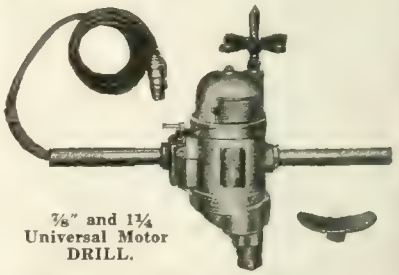

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THE COMPLETE PLUG FINISHED IN SIX MINUTES BY UNSKILLED LABOR

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One man can operate two machines, considerably reducing your cost per plug.

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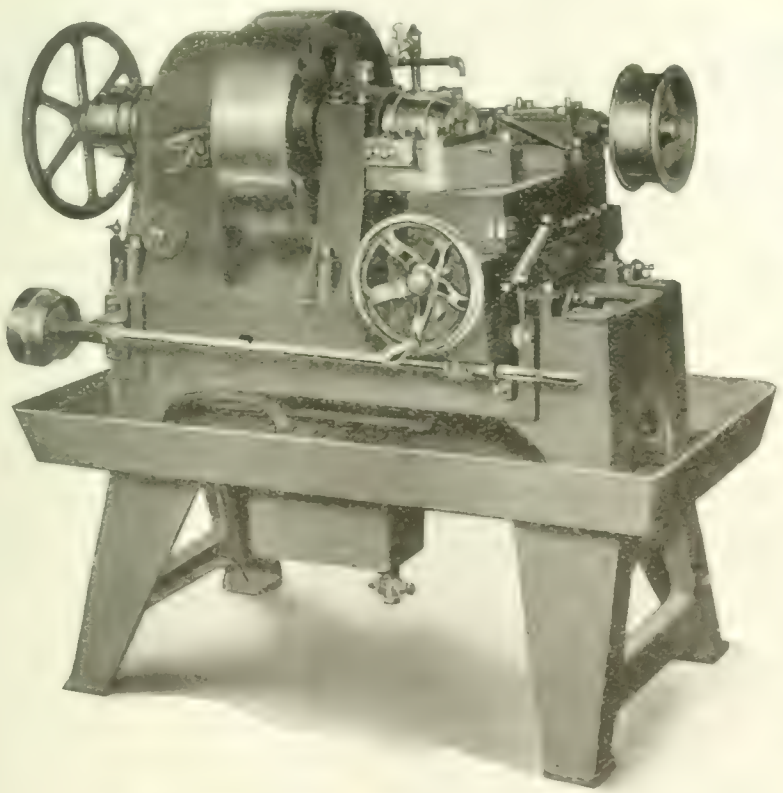
Drive pulley 18" x 6", with bronze bush having cut jaw clutch for turning and facing. Worm gear 100 to 1 ratio with jaw clutch for milling, driven by 10" x 1½" flanged pulley. The milling cutter is driven by an 8" x 2½" flanged pulley. Tool post carriage is equipped with power feed (two speeds), having automatic stop. Power feed pump with relief valve driven, from worm shaft (all drives direct from main line shaft). Rigidly built: simple and economical to operate.



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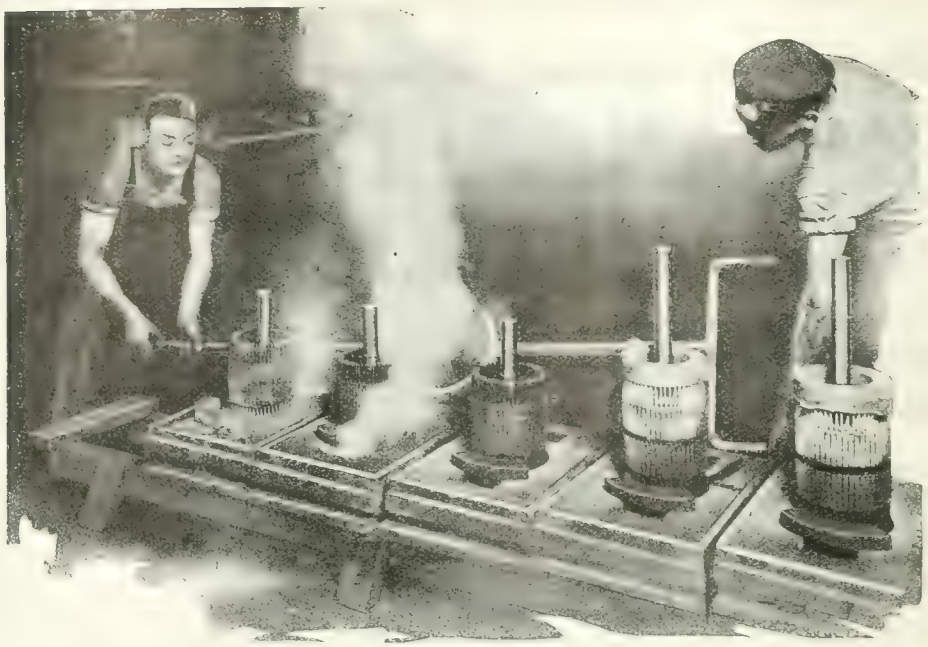

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Locomotive Construction from a Maintenance Standpoint

By W. H. Winterowd **

IT is a question if there has ever existed an enginehouse foreman who has not, at some time or other, had the feeling that if some part of a locomotive had been designed a little differently, he could make repairs quicker, easier and at less expense.

While in many instances he may have been justified in this feeling there are, however, cases influenced by other factors which may have been of greater importance from the standpoint of ultimate economy of operation.

The type and size of a locomotive have an important bearing on certain details of design. A discussion of the factors relating to the selection of the desired type and size is far beyond the scope of this paper as it would involve a thorough consideration of the economics of railway operation. Some of these factors, usually considered from the standpoint of both present and future, are grades, track curvature, train speeds, train resistances, kind and nature of business, size and type of existing locomotives, transportation expenses, maintenance of equipment, and physical conditions such as clearances, bridges, turntables, enginehouses, repair shops, terminal and water facilities, etc.

Occasionally certain of these factors may be such that some detail of the resulting design, while undesirable from a maintenance standpoint, is unavoidable. However, the majority of locomotive details are free from other than purely local restrictions and may be designed almost entirely from a maintenance standpoint.

It should not be inferred from what follows that mechanical and operating men, as well as locomotive builders, have not given a great deal of consideration to the points mentioned. Very many locomotives in service to-day bear witness of such consideration. However, there are at present justifiable reasons for emphasizing and reviewing the importance of locomotive design from a maintenance standpoint.

Present Day Requirements

To-day, under changed conditions, the railroads are being called upon to render greater service than ever before. But little new equipment is available other than that which the railroads may build in their own shops. Repair shops are being worked to capacity. Skilled railway mechanics are scarce. Material of all kinds is difficult to obtain. All of which means that maximum service must be obtained from every bit of existing equipment. It is, therefore, essential to consider every legitimate means whereby the "out of service period" of a locomotive may be decreased and the "in service period" increased.

New an Rebuilt Loco Service

All new locomotives should be constructed to give maximum service with minimum maintenance. All locomotives being rebuilt, or modernized, should be turned out of the shops prepared to give similar results. Any improvement that can be made to any locomotive, new, modernized, or under repairs, which will result in increased service, increased efficiency, or decreased maintenance, will help to increase the capacity of the railroads.

The following covers briefly a few of the points worthy of consideration:

It seems hardly necessary to state that a well designed boiler of ample capacity is easier and cheaper to maintain than one of smaller capacity and which has to be forced continually. The importance of ample capacity can scarcely be overemphasized, either from a maintenance or operating standpoint. Within its limits of weight and size a boiler should be designed to have a capacity as large as possible consistent with other governing factors. In this connection the values of the superheater, the brick arch, and the feed water heater are unquestionable. These values have been practically demonstrated from the standpoint of economy as well as locomotive capacity.

Maintenance Factors

The maintenance of locomotive boilers is an important factor, the greatest difficulties being leaky flues, leaky mud rings, broken staybolts and cracks in firebox sheets.

Knowing that firebox heating surface does a great deal more work per square foot than flue heating surface, boiler capacity does not depend upon long flues. Short flues are the easiest to maintain.

Flue location and spacing should be carefully considered so as to permit easy maintenance, proper distribution of stresses with a minimum amount of staying, and also to facilitate washing out, particularly in bad water districts.

Many failures are frequently the result of crowding in too many flues, placing them too close to the heel of the flue sheet flange, and the use of too small a bridge.

The flue sheet flange radius should be carefully considered in relation to the flue layout. Too small a radius with flues located close to the heel will not give as much flexibility as may be desired and will make the top flues difficult to maintain. Continued expanding of the flues will cause the sheet to flow, often resulting in flange cracks.

The bead on the flues adjacent to the flanges should always rest on the flat surface of the sheet and never on the curved inside surface of the heel.

With two and one-quarter inch, or greater diameter flues it is best that the width of bridges be not less than three-quarters of an inch.

Detail Consideration

Assuming that these points have been taken into consideration, it is important to see that the shop layerout and driller follow the design. There have been cases where a layerout has located flues incorrectly and also added one or more. It is also important that flue sheet holes be drilled the proper diameter as it is almost impossible to keep flues tight in holes that are too large.

The radii of door and back head sheet flanges should be studied in relation to the staybolt stresses. A moderately large back head sheet radius will reduce the stress in outer rows of bolts by transferring a portion of the load to the wrapper sheet.

Too small a door opening radius will frequently result in cracking of the sheet at this point as provision is insufficient for expansion.

Mud ring corners of ample radius will be easy to construct and maintain. Trouble due to small radius has, in many instances, been overcome by electric or acetylene welding the bottom edges of the sheets at this point to the mud ring.

Flexible staybolts reduce staybolt breakage. A careful investigation will indicate the zones of maximum staybolt stress and sheet movement. In these zones the flexible bolts will give good results and reduce staybolt renewals.

Washout plugs should be so located that all points of the firebox and barrel can be easily reached with standard washout equipment.

Grates should have sufficient air space, be as free as possible from dead spots, and be easy to remove. Where certain kinds of fuel are used, properly designed dump grates may be a means of reducing the time the engine is on the ash pit.

As far as possible, all brackets, clamps or fittings applied on the boiler or firebox, should be so located that staybolts, rivets, or portion of caulking edges will be accessible with a minimum of labor.

In connection with the barrel of the boiler, points which may be mentioned are—throttle and dome arrangement which will permit interior inspection of

*A paper read before the Canadian Railway Club Montreal, Oct. 16, 1917.

**Assistant to Chief Mechanical Engineer, Canadian Pacific Railway.

the boiler without the removal of the standpipe; also the elimination, as far as possible, of all small studs. The latter will apply equally to all parts of the boiler under pressure.

Expansion slides, instead of an expansion sheet, under the front of the mud ring, will eliminate the maintenance of a considerable number of bolts and rivets. Proper consideration of all other expansion sheets will further reduce the maintenance of many bolts and rivets and tend to eliminate the many resulting troubles as well.

The front end, or smoke box, should be arranged to permit of access to all parts with the least possible work.

Frames

Frames should be of ample cross section and well braced to hold them rigid. Maximum cross section may be of little avail unless accompanied by sufficient and properly located bracing.

In this connection, it hardly seems necessary to mention the advantages of a valve gear located outside the frames. The outside gear has made posible better frame bracing, to say nothing of the advantages of easier inspection and maintenance of the gear itself.

As far as possible, bolt holes in frames should not be located where stresses are greatest.

Where cylinder design will permit, a one piece frame with a top tie splice seems desirable. Where large cylinders prevent the above arrangement, a one piece frame with ample depth under the cylinders, and having no reduction in thickness, will give excellent service.

Cylinders

The advantages of outside steam pipes are self evident from the standpoint of both construction and maintenance.

Cylinders should have saddle faces well bolted together to prevent working. All other things being equal a double row of bolts is better insurance than a single row.

Weakening grooves cut in covers will reduce repairs to a minimum in case of failure.

Motion.

All bearing pressures should be as low as consistent with good practice in order to reduce wear and resultant replacement.

Ample pin length is desirable in order to obtain lateral stability.

Arrangement of motion and design of back steam chest and back cylinder covers should be such that both valve stem and piston rod packing will be easily accessible.

Fillets on pins, axles, etc., should be of ample radius. Small fillets are frequently factors in failure.

Where possible a piston rod of sufficient length to permit piston ring renewals without the removal of the rod from the cross head will reduce maintenance cost.

Rod bolts and wedges may be dispensed with by the use of solid bushes. Rods should be designed and arranged so that it may be possible to remove them with a minimum of labor.

The Canadian Pacific Railway has found that knuckle pins with a small extension on the threaded end through which a strong flat cotter can be placed have been excellent insurance against the usual consequences of loose nuts.

Valves of light weight will reduce the load on all valve parts and result in reduced maintenance.

Selection of high grade, close grained, cast iron for cylinder and valve bushes, piston heads and rings, and in some cases rod bushes, is more than warranted in view of the increased mileage obtainable and the corresponding decrease in maintenance.

If conditions permit the consideration of heat treated, or alloy steels, unbalanced forces may be very materially reduced by the use of light reciprocating parts. The reduction of such forces will in turn tend to reduce maintenance of pins, bushings, etc.

Equalization

Locomotives should be equalized so as to secure the most efficient guiding power from both leading and trailer trucks, or wheels. This involves the proper distribution of weight and a means of keeping the proper amounts on the various axles at all times.

In general, the best results seem to be obtained by dividing the equalizing system so that the division between the front and back systems is as directly under the centre of gravity of the locomotive as wheel base and other conditions will permit.

The spring gear and equalizing system should receive particular attention when being erected and also when being repaired. The tops of the driving boxes should be milled out squarely and in a plane parallel with the journal bearings. The equalizer and saddles should be fitted to their seats squarely with the pin holes so that the engine will ride squarely on her springs and track properly. The same will apply to the trailer truck equalizers and spring rigging. Trailer trucks that do not carry the back of the engine level are responsible for much avoidable tire wear.

Spring and Brake Rigging

The application of bushes will facilitate and cheapen renewal of worn parts.

Hangers and their connections should be accessible and easily removable.

A driver brake man felcrum shaft in two pieces of equal length, the outer ends supported in bushed bearings integral with the main frames and the central portion supported by a sleeve, will give more even distribution of braking power and maximum accessibility for repairs and adjustments.

Brake cylinders, if at all possible, should be located vertically, in order to reduce packing wear and provide accessibility.

Brake shoe heads and hangers should be so constructed and hung that shoes will swing clear of wheels when pressure is released and permit easy application of new shoes.

Safety hangers should be provided to support and prevent sagging of brake rods.

The ratio of brake cylinder to brake shoe pressure should be kept as low as consistent, and should not exceed commonly accepted ratios. This will insure that fast travel will be kept to a minimum.

Piping.

The importance of ample clamping and provision for expansion cannot be overemphasized.

Piping should be as short as possible consistent with conditions.

Accessibility is of prime importance.

Piping should be so located that there is no obstruction of washout plugs, arch tube covers, pads, etc.

Where pipes pass through the front of the cab, provision should be made for clearance or for sleeve protection to prevent wearing or cutting.

The Canadian Pacific Railway has found it a decided maintenance economy to place lubricator piping from cab to cylinders, etc., in a slightly larger wrought iron pipe where the feeds pass beneath the jacket and lagging. By this means the feed pipes can be removed or applied without the necessity of removing any outside covering.

Air brake and steam piping should drain properly and contain no traps in which water can accumulate and freeze.

It is desirable that pipes from the sand dome be as nearly vertical as possible, the bottom ends being securely clamped in alignment with the rails.

Miscellaneous

Ash pans should be as simple as possible, and the sides should have sufficient slope to prevent the accumulation of ash under the grates. Swing doors can be suspended so that their own weight helps to keep them closed. This results in less strain on the door operating rigging.

Easy inspection and maintenance results from placing main reservoirs in an accessible location. Where this is impossible and drain cocks are hard to reach, an extension handle, the end of which is easily accessible, makes the reservoir easy to drain.

Removable lines on engine and tender truck pedestals make it easy to take up wear and reduce pedestal renewals.

To prevent rapid wear between wheel hub and liner face and driving box sufficent provision for lubrication should be made.

Shoes and wedges should be so designed that wear can be easily reduced and wedges kept in their proper place with a minimum of labor. Improperly maintained shoes and wedges soon result in increased maintenance of boxes, rods, pins, etc.

Pilots made of scrap boiler flues cost less to maintain than those of wood.

All oiling points should be made as accessible as possible. Handholds or small steps, properly located, to make

oiling points accessible, will soon pay for themselves.

Lubricator chokes should be placed in proper position and located as near to the cylinder, or steam chest, as possible. Proper inspection and maintenance of chokes has been found the key to many lubrication troubles.

The location of the lubricator in the cab where the feeds may easily be seen and adjusted will result in better lubrication. When located close to the front of the cab, or where the light is poor, proper adjustment is exceedingly difficult.

Four pane cab side windows are easier and cheaper to maintain than those containing one large pane.

Boiler jacketing should be applied in sections, so that panels can be removed with minimum of labor.

The foregoing are but a few of the multitudinous details which merit most careful thought. But little mention has been made of the possibilities of simplified design by the use of cast steel. It is felt that with the development of the cast steel industry and the production of castings which are practically equivalent to wrought iron that locomotive construction in the future may be greatly simplified. We are to-day, using castings that ten years ago would have been deemed impossible to successfully cast. For example, one piece locomotive frames are now under consideration and will soon be in experimental service. These consist of the two main frames and all cross braces cast in one pieces. This is an indication of the degree of simplification that may be obtained. The maintenance of such parts has in turn been made possible by the development of the art of electric and acetylene welding.

The foregoing are simply a few indications of the importance of design in its relation to maintenance. To mention all the points that merit attention and to discuss them in detail would be far beyond the scope of this paper.

Good and far reaching results can be obtained by inviting criticism and suggestions from those directly responsible for construction and maintenance.

In conclusion, simplicity co-related with efficiency should be the keynote of locomotive design. This principle, which in other words is simply good judgment, will make for that degree of efficiency which will be reflected, not only in reduced maintenance costs, but also in the increased capacity of the locomotive plant as a whole.

IT IS stated in an American paper that the great guns which the Germans used at the commencement of the war were made of an alloy of molybdenum, in which this ingredient amounted to from 3 to 4 per cent. It is estimated that at present prices 12 in. guns made of an alloy of this kind, containing from 3½ to 4 per cent. molybdenum, would cost 25 per cent. more than with ordinary steel, but the useful life would be increased 2,000 per cent.

Features of Canada's Production of Munitions*

By Brigadier-General Sir Alex. Bertram

The results of Canada's participation in munition production have had a stimulating influence on the industries of this country, which, responding thereto, have demonstrated and brought into actual productive state many fields of enterprise and resources which otherwise might have remained more or less dormant for years to come.

FORTY years ago, in Canada there was practically no basic industry, beyond that of agriculture. A Canadian National Policy was devised as a nursery of Canadian Industry. Its provisions were merely so many practical devices for warding off the ailments of our infant industries. There were far-seeing men in those early days who knew of the great natural resources of our broad Dominion and who visioned what has come to pass. Yet it was the holocaust of war which has really made Canadians know Canada. Through the fiery furnace of the great conflagration we have been brought to the actual realization that the vision of our forefathers were not the dreams of speculative optimists.

BRIG.-GEN. SIR ALEX. BERTRAM.

That we had more than a country of magnificent distances, and that even our mountains and rock bound coasts were mines of infinite wealth was admitted in a general way within the present decade, but only practical men can realize the difficulties, or some part of them, which confronted those who first tried to organize and convert our great metal deposits into an efficient machine for the supply of munitions to the British Empire and our Allies.

Men, Money, Metals

Out of the chaos and crime of this awesome war, Canada has learned that her natural resources are now actual and active and that she has contributed the three great essentials of war—men, money and metals—in generous quantity and in superb quality:—that we shall benefit from this development in the years and the ages to come is what you must know and feel.

Let me preface or illuminate the figures which I am about to give you; we have shipped in shells a sufficient tonnage to build nineteen bridges across the St. Lawrence River, each bridge equal to the size of the Quebec bridge. We talked a few years ago of contributing three battleships; our tonnage in shells shipped to the Empire would build sixty-six battleships of 18,000 tons each.

My remarks deal only with munitions. What Canada has done and could do, could be written in other chapters of industry. It is my purpose therefore, to speak only on the manufacture of munitions in Canada and also to place before you a statement of the quantity of shells and the weight of material, in steel, copper, spelter and lead required to complete the orders given by the British Government.

The introduction of the refining of copper and spelter is a new industry in Canada. The Consolidated Mining & Smelting Co. of Trail, B.C., are producing 360 tons of copper, 1700 tons of lead and 1200 tons of zinc per month. This taxed the capacity of all our steel producing and refining plants. There were also new plants organized for the manufacture of all kinds of explosives.

Ships and Aeroplanes

Concurrently with the carrying out of the production of munitions as indicated above, the Imperial Munitions Board was given large contracts for the building of ships of all sizes. Few men but those who live by the lake and sea know that huge contracts for ships are being carried to completion daily, and that every old shipyard and many new shipyards are working day and night. In connection with this, I may here make a suggestion to Timid Capital. The component parts of ships are all made in Canada with the one important exception, we have to import all the rolled plates for the steel ships. It only requires this one industry to balance up the component parts of shipbuilding. I am pleased to state that this is now under serious consideration.

The manufacture of aeroplanes was introduced about eight months ago and to-day is an excellently developed organization, producing upwards of one hun-

* Read before the regular meeting of the Montreal branch of the Canadian Society of Civil Engineers.

dred (100) aeroplanes per month. Plans are being put into operation to double this output immediately.

In addition to this, the Board have established plants for the manufacture of nitrocellulose powder, T.N.T. and cordite.

The production of these factories are enumerated herewith:—

Shell		Tons
18 pdr. Shrapnel	27,931,714	189,556
18-pdr. High Explosive	5,300,908	71,559
4.5" H.E.	8,738,470	235,893
60-pdr. H.E.	1,097,317	48,281
6" H.E.	2,959,626	233,310
8" H.E.	747,190	113,106
9.2" H.E.	744,179	168,155
Total	47,519,404	1,029,860

Cartridge Cases		Copper and Brass
18-pdr. Cartridge Cases	30,188,904	
4.5" Cartridge Cases	9,466,523	
Total	39,655,427	20,768 tons

Shell Forgings Exported		
18-pdr. Shrapnel Forgings	447,112	
4.5" H.E. Forgings	3,574,214	
6" H.E. Forgings	899,711	
Total	4,921,037	138,498

Propellants and Explosives

British Chemical Co. T.N.T. Produce about 40,000 lbs. per day, nitrocellulose powder about 80,000 lbs. per day. Approximately 46,000,000 lbs. of T.N.T. has been manufactured since the commencement of the war. The number of boxes required for all sizes of shells and explosives runs up to about 25,000,000.

Cordite

The production of the British Cordite Co., Ltd., will reach in the neighborhood of 2,000,000 lbs. per month.

Time Fuses

British Munitions in Montreal.—This was also a new industry and plants were organized for this purpose and when operating at full force they produce 40,000 time fuses per day.

Acetone

I might state in connection with this, that one plant was volunteered for this purpose and is to-day producing over one hundred (100) tons per month. It is a model of perfection and has been reliable and a satisfactory source of supply of this commodity, which is used in the manufacture of cordite.

Electric Steel

When a year ago there appeared to be a shortage of steel the Board established an electric steel melting plant for the purpose of utilizing the scrap material. This plant is almost completed and to-day is producing steel for the British Government. They expect to reach approximately 4,500 tons per month.

The total value of all munitions and supplies purchased since the inception of the shell making industry from September 1914 to September 1917, is approximately $700,000,000. The work carried on embraces no less than 400 factories and plants in the Dominion, three-fifths being directly associated in the production of shells and two-fifths associated with the production of components, basic supplies and shipbuilding. The object, from the inception of the manufacture of these shells was to produce the finished article from the raw materials found in Canada's own mills and mines. This has been done. The shells have been made in Canada from fuse to cartridge cases.

The Imperial Munitions Board has accomplished a great work in the present and has presaged a great future for the industries of Canada. When the history of their accomplishments may be written; when the stories of how they have had to surmount adverse conditions can be told without reservation; then only will you know, as I know, what a magnificent and stupendous work has been carried out for the benefit of and for the future of the Dominion of Canada.

ROUGHING OUT LUMBER FOR AEROPLANE CONSTRUCTION IN A LONDON, ENG. FACTORY.

EFFECT OF STORAGE ON COAL

A REPORT on the deterioration in the heating value of coal during storage, covering a five-year period, has just been issued by the Bureau of Mines, Department of the Interior, as Bulletin 136, Horace C. Porter and F. K. Ovitz being authors.

The tests show that the amount of deterioration of coal in heating value during storage has commonly been overestimated. Except for the sub-bituminous Wyoming coal, no loss was observed in outdoor weathering greater than 1.2 per cent. in the first year, or 2.1 per cent. in two years.

The loss in heating value is given for New River and Pittsburgh coals during five years' storage in the open air and under water, for Pocahontas during two years' storage in the air, and for Sheridan, Wyoming, coal during two and three-quarters years' storage in the air.

The tests with New River and Pittsburgh coal were made to determine the advantage to be gained by storing coal under water, and particularly under salt water. The results show that storage of New River coal under water effectively prevents deterioration of calorific value and that storage in the air under severe conditions causes only small deterioration, about one per cent. in one year's exposure and about two per cent. in two years. After two years the loss is continuous but slow, reaching 2.5 to 3 per cent. in five years. The deterioration of Pittsburgh coal during one year's open-air storage was practically negligible. During the second, third, fourth and fifth years the deterioration proceeded very slowly and did not reach an amount greater than 1.1 per cent. in five years. The submerged portions suffered no loss measurable by the degree of accuracy of the methods used.

The tests of Pocahontas coal, a semi-bituminous type, were undertaken chiefly to determine the effect of tropical conditions in Panama. They were made on an outdoor pile of 100 tons of run-of-mine coal. During two years' outdoor exposure this coal deteriorated less than one per cent. in heating value.

The Sheridan, Wyoming, sub-bituminous coal, known also as "black lignite," is commonly supposed to deteriorate rapidly in storage, especially by "slacking" or crumbling of the lumps. Under the conditions of the tests this coal lost 3 to 5.5 per cent of its heat value in two and three-fourths years' storage, the greater part of this loss being in the first nine months. In general, the lumps became badly cracked, but retained their form sufficiently to permit ready access of air. However, they were weakened so that they broke up badly on handling. By the use of bins with air tight bottoms and sides and a protecting layer of fine slack on the surface, the deterioration of Sheridan coal in heat value can probably be kept below 3 per cent. in one year, and the physical deterioration can also be largely prevented in the under portions of the pile.

The results show that the amount of deterioration of coal in heating value during storage has commonly been overestimated. With coal such as New River and Pittsburgh the expense of underwater storage equipment is not justified

except as a precaution against loss from spontaneous combustion.

Detailed results and a full account of the tests and analytical data are given in the bulletin, which may be obtained free of charge by addressing the Director of the Bureau of Mines, Washington, D.C.

SHELL MANUFACTURE SHOWN BY MOTION PICTURE

By R. Hamilton.

TO the average layman the mention of moving pictures conveys no other meaning than a brief sojourn at a regular "movie" to wile away a pleasant hour; but that this art has a deeper and wider purpose for enlarging on the present methods of industrial and scientific education was amply demonstrated at the regular monthly meeting of the Montreal branch of the Canadian Society of Civil Engineers, when through the courtesy of Brig.-Gen. Sir Alexander Bertram the members and their friends were favored with a highly interesting and instructive summary of what has been accomplished in Canada during the past three years, in connection with the manufacture of muntions of war, and also the component parts.

Apart from the figures submitted by General Bertram, showing the magnificent but stupendous achievement of Canadian manufacturers in undertaking and placing upon a successful footing an industry that has rapidly attained to front rank in the country's activities, the feature of the evening was the showing of five reels of motion pictures illustrating in every detail the production of the 8-inch high explosive shell from the blast furnace to the forge, through the successive detail operations of machining and packing, and thence their transportation to the field artillery, the last reel including actual scenes from the French battle front. The pictures were reproduced upon the screen in such a vivid manner that the impression was almost one of actual observation of the work in the shop. To those unacquainted with modern practice in shell-making, and also to many who were thoroughly conversant with plant methods, the pictures were a revelation; not so much respecting the shop work, but in the remarkable clearness with which every detail was reproduced, amplifying the possibilities of the motion picture as an educator of the highest standard.

HOW TO MAKE YOUR OWN LOG TABLE

HAVE you ever been "out in the woods" away from a table of logarithms and "up against it" simply because you didn't have any logarithms to work with?

If so, this rough method of finding approximate logarithms will doubtless interest you. It is simple and very easily remembered.

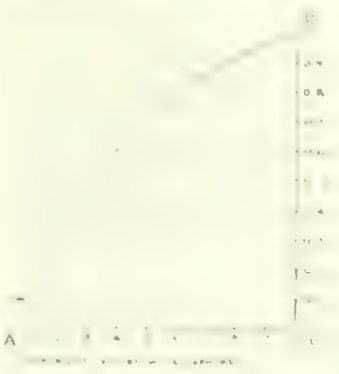
HAVE you ever been "out in the woods" angles to each other. From the intersection lay off nine equal spaces to the left as shown and mark them 1, 2, 3—10 from left to right.

Then lay off ten equal spaces upward from the intersection as shown and mark them 0.1, 0.2, 0.3, etc. Then, with the extremes A and B as centers, and distance AB as the radius, locate center D. From that center describe the arc AB.

We are now ready to read off our approximate logarithms. For example, what is the logarithm of 4?

The dotted line shows how it is found. It is just a "hair" more than 0.6.

Anybody familiar with logarithms will now understand the rest.



LOGARITHIM CHART.

It is more convenient, of course, to make the drawing on squared paper, but if such paper is not handy one can easily do without and use plain paper.

Of course, this is not claimed to be "better" than a logarithm table, nor is it as good, but as an approximate method results will be found to be "pretty close" to the tabular results. Best of all is its simplicity and the ease with which the method can be remembered. Do it once and you will never forget it.

Wm. Murdoch, C.E., city engineer of St. John, N.B., died suddenly on Oct. 8, of apoplexy. Mr. Murdoch was born in Paisley, Scotland, 69 years ago.

VIEW OF ASSEMBLING DEPARTMENT WHERE AEROPLANE WING FRAMES ARE PUT TOGETHER.

PRODUCTION METHODS AND DEVICES

A Department for the Interchange and Distribution of Shop and Office Data and Ideas Evolved from Actual Practical Application and Experience

THE MANUFACTURE OF TAPS FOR FUSES

By H. James.

THE manufacture of fuses has developed many new processes and revived many old recognized methods, but the extreme inspection demands have brought forth attention to detail that many makers had previously failed to consider.

The greatest difficulties experienced seem to have been caused by the failure of machines to line up correctly or to remain so under the exceptional demands put upon them. Working from different ends of the fuse instead of from the same end, and the evils of frequent rechucking have been contributing factors in producing inaccuracies. Yet not all of these points are the sole causes of rejections. Threads have given their quota of difficulties which are partially due to the not-go plain plug or plain ring gauges which measure the root or outside of the threads.

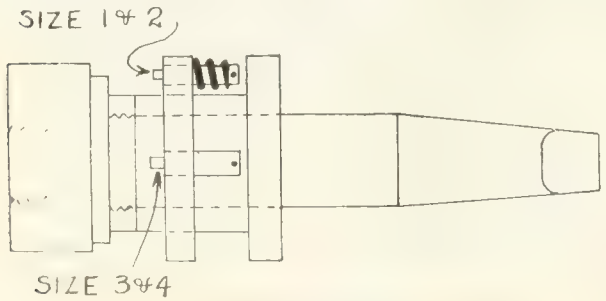
CAP WITH PRICK PUNCH HOLES FOR MARKING DIE. AND BLOW PIPE NOZZLE FOR DRAWING BACK PORTIONS OF DIE MARKED X.

The difference between the root diameter of the go thread and the not-go plain plug or ring diameters varies from .008 to .010 in., and the sizes of commercially produced machine taps vary from .003 to .008 in., consequently specially made taps are necessary in order to obtain the required results.

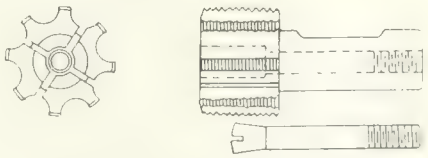
Problems Involved.

The making of accurate taps for cutting brass was an operation few were accustomed to perform. Some of the problems were how wide should the lands be, how many teeth should there be, how should they be hardened and how should they be ground, should they be relieved, and how should the lead of first teeth be ground.

These are not all the important factors, as the size of the hole to be tapped is of great importance as is also the action of tap in going in and coming out. Small sized taps wear out and break so rapidly that their manufacture is a production proposition.

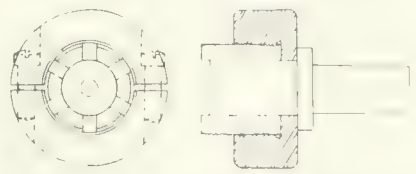


"MODERN" DIE HEAD WITH ADJUSTMENT FOR FOUR SIZES.



EXPANSION TAP FOR FUSE BODY.

The master taps for making dies were made on a bench lathe having an accurate lead screw. There were only ten to each set, and each tap cut .002 in. With these taps two spring dies were made. These dies had three lands which provided enough strength and gave enough chip room. The metal marked on sketch was drawn back with a gas flame controlled by a special nozzle screwed to the regular torch. This nozzle had a hole 1-64 in. in diameter, which permitted of a fine jet of flame. In making these dies,

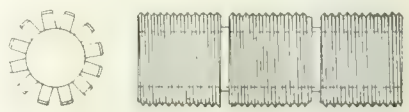


TAP FITTED WITH INSERTED CHASERS.

instead of laying off the holes on each separate pieces, a convenient piece of brass stock was bent to form a cover which fitted over the die blanks like a cap. This cap had centre punch holes drilled through and all that it was necessary to do was to place the cap on a blank and centre punch mark through the holes. After the three holes were drilled, they were plugged with drill rod and the tapping hole drilled and tapped. A Modern die head was now rigged up with a special shank to fit in a lever feed tailstock and with a bearing surface back of die head proper, just long enough to hold a collar and sliding bush. This bush held two filler blocks which were oblong in section and which varied .003 in. on each size, making 4 sizes in all.

The drill rod for the taps was cut to length and had one end chamfered the correct angle for lead. These pieces were held in the bench lathe with drawback collet chucks and the die head run over them. The Modern die head is so arranged that by now putting in each filler block in turn and pulling it out before it jambed, it was possible to further reduce the size of blocks. These filler blocks were placed in between the die block and lug. The last two reductions of .002 in dia. were done with the special dies, also held in a floating holder held in the tailstock. All taps were, however, completed with die-head and then regripped in collet for each succeeding operation. In this way 15 taps were produced in each hour.

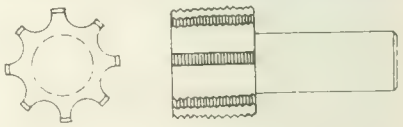
The fluting of taps was done on a bench lathe equipped with milling attachment. Hardening was done in a small electric furnace at 1,475 deg. Fahr. and in drawing them back to an orange straw, a bench forge was utilized by placing a plate on it, and on this plate the taps were placed. As they arrived at the correct color, another tap was rolled on which rolled the one to be drawn, off into the water and the others progressed, being one tap nearer finished. The smaller sizes, say .164 in. in diameter were made with three teeth in order to provide sufficient chip room. It was found that taps must be allowed to run themselves out without pulling or forcing them, or they would cut large. They should not be relieved on the straight part or the chips are liable to



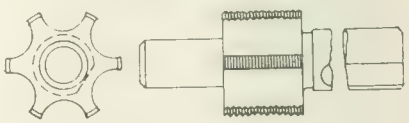
STRING OF CHASERS BEFORE SEPARATING.

wedge in the tops of the threads which will be spoiled.

In making commercial taps, male or female gauges may be used for sizing, but for fuse work the taps must be made to size or be adjustable. The smaller sizes are, of course, too small, but for the larger sizes it is a profitable design to have them adjustable, as each fraction of a thousandth wear can be taken up by packing behind chasers. Two approved designs are shown. The expansion type is not so successful as the inserted chaser type, as it is difficult to get the teeth to expand evenly after hardening. If, however, a thin wall of metal is allowed to remain between teeth after milling and after the hardening is done, this



TAP USED FOR CUTTING DIES FOR FORMING CHASERS.



HAND TAP WITH PILOT.

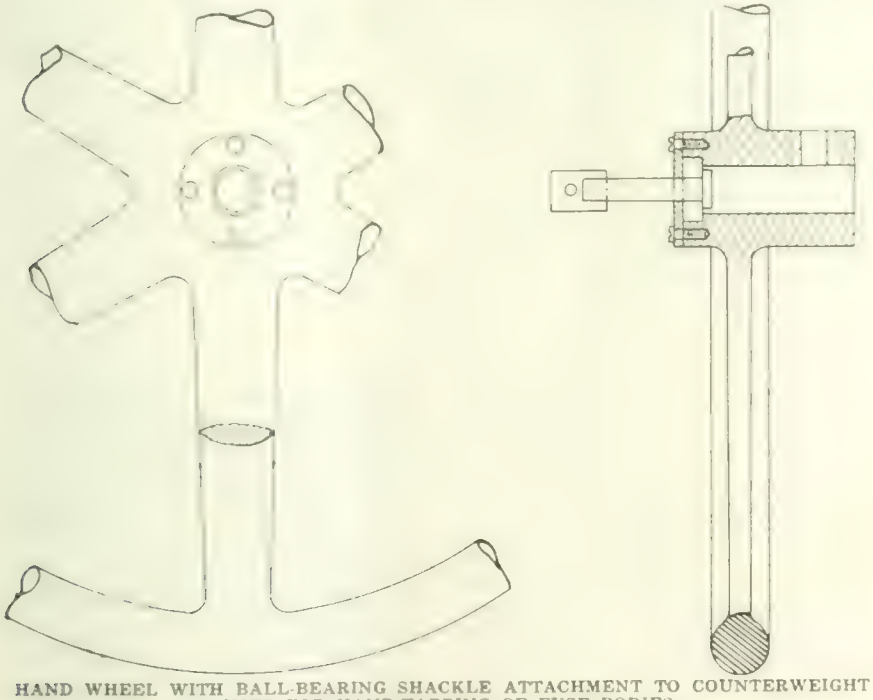
metal is ground away some of the difficulty will be eliminated.

Inserted Chaser Taps

The inserted chaser tap is very effective, because as the machine bearings or tool holders become worn, the differences due to the drills and taps being out of line and cutting large, may be com-

pensated for by grinding off the back of chasers. In making these chaser taps for this class of work, great care was taken to make the bottoms of the slots in holder concentric with the stem or shank. After chasers were inserted, the holders were placed between centres and the lead ground, care being taken that the angle was not the same as the chamfer or recess in work which was to be threaded. If the angle was the same, it was found to be difficult to get the tap to start. All threads on taps were cut with a very smooth finish and after hardening they were dipped in a little oil containing emery flour and the threads held to a wire revolving brush. Instead of grinding off the heel of chasers as it is necessary to do for the larger sized taps, they were cut larger in diameter and in strings as the sketches show. The strings of chasers were cut with a rivet dock which hastened operations. Taps with teeth cut radial and with a slight rake gave the greatest satisfaction.

Hand taps for final sizing or rectifying were made with a pilot which greatly facilitated starting the thread, all the more so when the regular wrenches were abandoned in favor of hand wheels which made it possible to accomplish half the job with the centrifugal force due to the weight of the rim. Girls or women performed the hand tapping and in nine hours as many as 1,500 fuse bodies have been tapped, although the general practice was 1,200.



HAND WHEEL WITH BALL-BEARING SHACKLE ATTACHMENT TO COUNTERWEIGHT USED FOR HAND-TAPPING OF FUSE BODIES.

THINGS ANYBODY CAN DO?

By D. A. Hampson.

BUILDING a fire in the forge and dressing an emery wheel! Anybody can do those things, you say—and yet if you come right down to the fine point, few mechanics can do these homely but important tasks well.

Building the Forge Fire

While any man can build a fire of some sort, not every one can build a forge fire in a room occupied by other workmen without almost smoking them out. Following the few simple rules will make this easy. To begin with, scoop out the coal over the tuyers down to the lining of the forge or to the pan itself if it is unlined, making a pocket that will just about hold a double handful of shavings. More shavings than this are unnecessary. If shavings are not available, use excelsior wadded into about the same size. Waste will do in a pinch, but is open to several objections, principal of which are the odor from burning, greasy cotton, and the loss of expensive material, for in these days it pays to have waste washed.

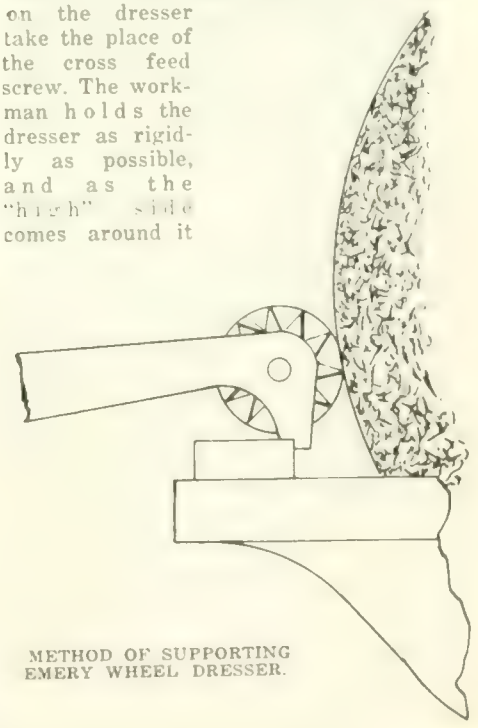
The pocket made in the dead coal is better than scraping the coal all away, for it starts the fire in compact form and prevents many a lost start. As soon as the shavings are lighted, begin to throw on pieces of coal that have once burned—not fresh coal or clinkers—and turn on the blast gently. If the blast is started too hard, the shavings will burn so quickly that the coal does not get a chance to ignite; what is wanted is just enough air to keep the fire going and furnish free, smokeless combustion for the shavings, but at the same time, to burn slow enough to give the coal a chance to "catch." Following the flame with a light covering of coal—not too much in the middle—will produce in less time than it takes to tell it, a small but live fire that may be enlarged if it is so desired. And the best part of it is that the trick could be turned in your own parlor without creating any smoke that you could notice.

Dressing the Emery Wheel

It is hard to impress upon the minds of many mechanics the fact that the wheel on which they sharpen their tools must in turn be sharpened and have the nicks taken out of it. Not many jobbing shops possess a diamond, but they all have one or more emery wheel dressers around somewhere, that use fluted or star wheels, or cutters. These wheels present a broken area of contact to the emery wheel or grindstone and as they revolve with the latter, they cannot slide along and fill or glaze as does the work being ground. As they revolve, the hardened points cut or break up the surface of the grinding wheel, thus exposing new, sharp grains for working. A few passes across a grindstone or emery wheel will do this sharpening.

But through the carelessness of workmen the face of grinding wheels gets grooved and dug up, and, worse still, they get flat spots worn on them producing what appears like a wheel out of round. To restore the wheel to a round again requires something more than following across with the dresser. The high side must be turned off and the process is similar to a like job in the lathe, but the tools used are the dresser and the work rest of the machine; in case the latter is of odd shape, a bar of steel and two C-clamps will answer.

The drawing shows how the work is done. The dresser is the cutting tool, the bar of steel corresponds to the cross slide, and the hands aided by the hooks on the dresser take the place of the cross feed screw. The workman holds the dresser as rigidly as possible, and as the "high" side comes around it is cut down, each revolution taking a little more. In doing this, the work is started on that part of the wheel that is largest in diameter and a cross movement imparted to the dresser so it doesn't cut grooves in the wheel just as would a piece of work held in one place. Keeping up this cross movement with the handle of the dresser held fixedly in one place and gradually raising it, will cut the stone down to a true cylinder. But it takes care and it couldn't be done except from the steadying provided by the hooks on the dresser.



METHOD OF SUPPORTING EMERY WHEEL DRESSER.

PATTERNMAKING NOTES

By J. W. Broadbent.

Contraction of Castings

WHEN cast iron and other metals are in their molten state they occupy more space than when cooled off to the temperature of the atmosphere; in the natural process of cooling they contract, and, therefore, it is necessary to make the mould into which such metals are poured larger in such proportions as have been found by practice to govern the contraction of different metals.

Shrink Rules and Their Use

To enable the patternmaker to build up his patterns, with the necessary allowance for this contraction of metals without wasting time making approximate calculations, what is commonly called a shrink rule is used. Shrink rules are made longer than the standard rules of measurement, and are graduated proportionately, for instance: the foot rule generally used for measuring a pattern from which a casting is required in cast iron would be exactly ⅛ in. longer than the standard rule.

For general work the following contractions have been found to work out fairly well:

Cast Iron	
Small castings with cores	⅛ in. per ft.
Large thick castings	1-16 in. per ft.
Beams and girders	1-10 in. per ft.
Large cylinders	3-32 in. per ft. dia.
Small cylinders	1-16 in. per ft. dia.
Malleable iron	3-16 in. per ft.
Steel	3-16 in. per ft.
Brass—	
Thick castings	5-32 in. per ft.
Thin castings	3-16 in. per ft.
Copper	3-16 in. per ft.
Aluminum	17-64 in. per ft.
Zinc	5-16 in. per ft.
Lead	5-16 to ¼ in. per ft.
Tin	9-32 in. per ft.
Silver	⅛ in. per ft.

These rules, of course, will not hold good in every variety of castings, and must not be taken too literally, as cases happen in the moulding shop which knock all one's pet theories on the head, for it is only by practice and observation that just the exact allowance for contraction can be given in special classes of work.

A heavy casting will contract less than a light one, and hard white iron will contract more than soft grey iron, as also different mixtures of iron will contract differently.

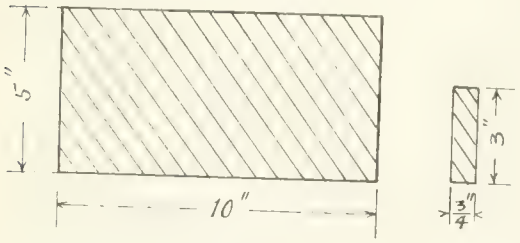


FIG. 15.

Cores will often prevent the free contraction of a casting, and the rapid or steady lowering of the temperature of the metal in cooling also has an influence on the ultimate size of the casting.

There is always an element of uncertainty about the contraction of a badly proportioned casting, and where heavy and light sections are combined there is danger of the casting cracking from the unequal contraction, making it necessary for the moulder to expose the heavy parts to the air as soon as the solidity of the metal will admit of it. A good example of uneven contraction is a pulley with a heavy hub, where the thin rim contracting faster and more than the arms and hub, often causes the arms to crack, the reason being that the metal in the thin rim has become solid, and is already contracting while the heavy hub is yet in a semi-molten state. When the hub solidifies it contracts, pulling the arms with it and causing a strain which will make the arms crack when the pulley gets a slight jar.

Importance of Proper Proportions

The patternmaker in a small shop where no draughtsmen are employed has often to design his own jobs, and it is necessary that he should be able to produce work in proper proportions, and not put a big heavy hub on an otherwise light pulley, or heavy ribs or flanges on a weak casting, thinking by doing so that the casting is strengthened. Some castings having heavy ribs crack much sooner than if the supposedly strengthening pieces were left off altogether owing to the strains caused by the cooling of the metal.

As an illustration of the unequal contraction of light and heavy castings, we will assume that two bars are cast, each 12 ft. long, with the sections shown in Fig. 15, one being 10 in. by 5 in. and the other 3 in. by ¾ in.

Upon measurement of the cooled castings it will be found that the light one has contracted twice as much as the heavy one.

Theory of Contraction

The most plausible theory that can be presented for this unequal contraction is that some parts of a casting must cool faster than others, and it naturally follows that the outward portions—these being nearer to the sand of the mould—must be the first to solidify. In the heavy casting the outside commences to cool, and also endeavors to contract, but owing to the mass of metal inside this crust being in a semi-molten condition, and not yet in a state of contract, the outside is held in tension.

There is a certain feature in the nature of iron that permits its particles to be stretched to a certain limit, but when this limit is exceeded the result is a cracked casting. As the inside begins to cool and tends to contract, the outside has by this time lost most of its heat and contracted about all it can, thus forming a resisting force and preventing the natural contraction of the inside portion. In the light casting there are none of these conflicting forces to contend with, and it, therefore, contracts about all that the grade of iron composing it naturally calls for.

Effect of Rapping

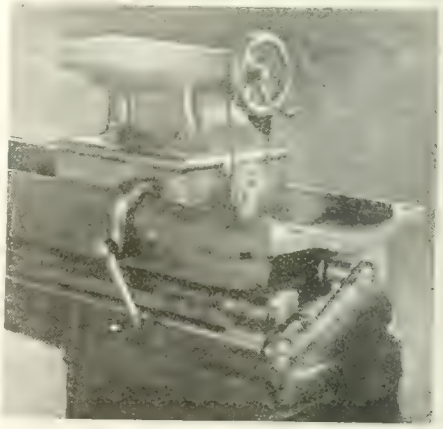
Small castings, say, 6 in. or under in size, will generally come out as large, and sometimes larger, than their patterns, owing to the moulds becoming enlarged by rapping the pattern. In theory, the shrinkage of a casting 3 in. long would be 1-32 in., and it is easy to see that it does not need very much effort for a moulder to enlarge a mould to that extent. In machine moulding, where the loosening of the pattern is reduced to a minimum, there will necessarily be the average variation in size between the casting and pattern.

Another effect of the variation in sections of a casting is to cause the casting to "buckle" or "warp," and it is impossible to lay down any reliable rules as to how much this warping will be. The only guide as to how much a pattern must be rounded in the opposite direction to that in which the casting will go hollow is by observation and experience. The rule appears to hold good that a long light narrow casting will warp more than a broad heavy one, and a slight excess of metal in a light casting will cause a curve in the direction of that excess.

A TAILSTOCK DRIVE

By A. L. Loy.

HAVING a great deal of boring and facing to do on certain parts, and the shop not being provided with a turret lathe, it was decided to rig up one of the standard engine lathes, so that these two operations could be carried on simultaneously. The feed shaft was provided with a sprocket at the end, this in turn driving another shaft in the centre of the bed, one bearing being in the end of the bed, while the other was carried on a bracket extending down from the tailstock. A small sprocket on this shaft drove the one just inside of the hand wheel, and which could be connected to the same by inserting a pin through the two. The size of the sprockets was such that the feed was just one-half that of the cross feed. This arrangement worked very satisfactorily and resulted in a considerable saving on such jobs as could be handled in this manner.



TAILSTOCK SPINDLE DRIVEN FROM HEAD SCREW.

STEEL CONDUCTORS FOR ELECTRICAL WORK

By D. Street.

GERMANY set the fashion in the use of steel conductors for electrical light work indoors, because, as all the world knows, she requires all the copper she can get hold of for her shells, but now America is following suit because copper is dear; the war has sent up the price to figures that copper mine owners have only hoped for; and now British electrical engineers are also turning their attention in the same direction. Every one is talking of the big bill to be paid after the war and how it behooves everyone else to be saving in every possible way to help pay the bill. After the war it is more than probable that there will be a good deal of inside wiring done in buildings for electric light and power. The metallic filament incandescent lamp enables electric light undertakings to compete very favorably with gas, even in towns where gas is cheap and electricity dear, while the advent of the half watt lamp promises to enable the electric light to sweep the board. In addition, electricity is becoming more and more used in plates of business and private houses for heating and power. Electric cooking is also steadily making its way, as well as the heating of offices and rooms in private houses that are only used occasionally; the latest one price hotels in London have electric fires in all the bedrooms.

All this means more and more small insulated electrical conductors; a great deal of copper. If iron or steel can be substituted for copper for all conductors below a certain gauge, there will be a great saving in copper that can, of course, be used for other purposes; and there should be a considerable saving in cost.

Relative Efficiency

Iron and steel wire of any given gauge, the small gauges for instance used for the bulk of inside work, is only a fraction the cost of copper wire of the same gauge. Iron and steel have electrical resistance six and seven times that of copper; but in a very great number of cases, if the matter is carefully gone into, it will be found that the increased resistance is not of much consequence. The smaller currents required for the metallic filament and half watt lamps allow of distributing conductors of very much higher resistance being employed with the same result at the lamps.

According to the rules issued by the Institution of Electrical Engineers, a total drop of three volts only is allowed, practically inside a building; but a drop of three volts with a certain number of the old carbon filament lamps, taking anywhere up to four watts per candle, is a very different matter from a similar drop with either the metallic filament lamp or the half watt lamp. Merely substituting half watt lamps for carbon filament lamps, where this is practicable, should enable the resistance of the distributing conductor to be increased by at least the difference between the resistance of copper and steel. And this is not all; by the rules of the Institution of Electrical Engineers, no copper conductor is allowed to be employed for work of the kind mentioned of a smaller gauge than No. 18 S.W.G. The reason for this is a purely mechanical one. The passage of an electric current through any conductor tends to make it brittle, particularly at the points where connections are made to terminal screws and at joints; with the result that if the wires employed are allowed to be too small there is a strong tendency for them to be continually breaking at those joints. When joints are made also, as is well known, it is difficult to leave the metal conductor on each side of the joint in the same condition as before the joint was made; there is an increasing tendency to brittleness. Soft steel wire, such as could easily be drawn, would have a very much higher tensile strength than coper wire of the same gauge; and if properly drawn and properly handled should be very much stronger in every way; in fact, so far as mechanical strength is concerned, it should be quite safe to employ soft steel wire of No. 20, and even smaller gauges. The soft steel wire should stand the handling of careless wiremen very much better than copper wire, so that there should be a considerable gain all round.

Manufacturers of insulated wires who have to tackle the problem of insulating the iron wires very carefully, but there is no reason to suppose that there would be any difficulty about the matter; it is more than probable that carefully drawn soft steel wire would be more easily covered with an insulating envelope than copper wire.

Possible Hysteresis Loss

One objection to the use of iron or steel wire is the possible loss that may arise from hysteresis in the wires themselves. It will be remembered that when a current of electricity passes through a conductor it creates a magnetic field around the conductor; and every magnetisable substance meeting the lines of force thrown out from the conductor, responds to them. As the great bulk of electric lighting is now done by the aid of alternating currents, this means that each of the wires forming a pair of conductors, if they were of iron or steel, would be magnetized alternately fifty times a second, or whatever their periodicity might be; and there would be a certain consumption of energy in accomplishing this.

For the small conductors employed for indoor work the loss due to this would be very small; it would be merely an addition to the loss due to the power factor of the whole system, and not a great addition. It is found of advantage to employ alternating currents for distribution, for light, heat and power, notwithstanding the undoubted losses due to the power factor, even under the most favorable conditions, and the small aditional charge due to the employment of iron or steel wires for indoor work would be really inappreciable. It should be remembered too, that cables carrying alternating currents are armoured when they are laid in the ground; known that there is a resultant magnetic field produced outside of the conductors, which is constantly changing and which must lead to hystersis losses in the armour of the cable or in the iron piping; the additional loss due to the use of iron or steel wires for the conductors themselves should be quite negligible.

SULPHUR FROM GAS ENGINES AND ELECTRICAL EQUIPMENT

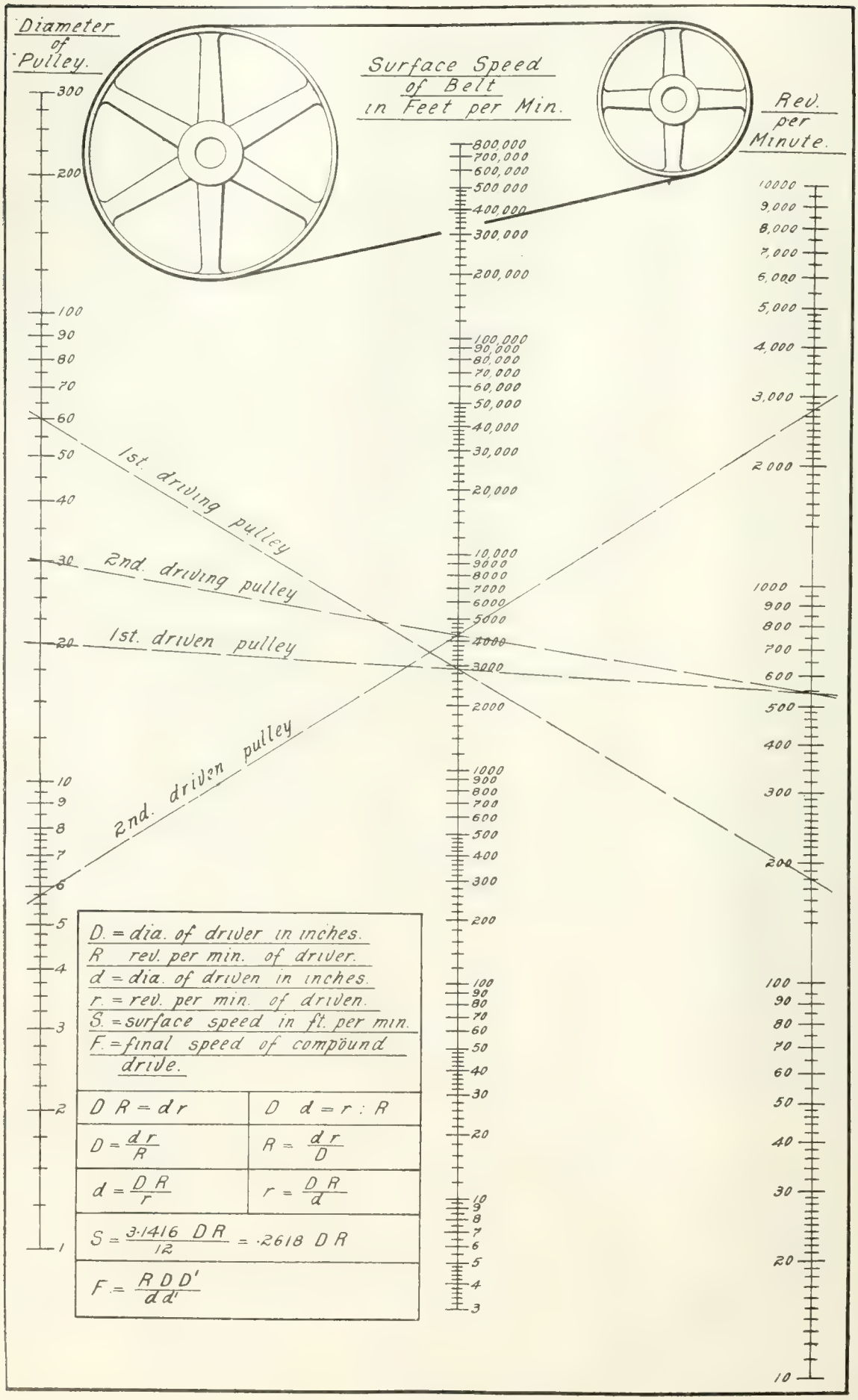
By T. J.

IN the search for the economic generation and use of power, the association of gas engines as prime movers with electrical apparatus is becoming more and more general. There is certainly much to be said in favor of this, and therefore it is all the more necessary to face such difficulties as crop up in actual practice, as frank recognition of drawbacks usually lead to the discovery of means to overcome them. Now, one of the points that calls urgently for consideration is the fact that power houses which are equipped with large gas engines, especially those working with furnace, coke oven or producer gases, present troubles in connection with the maintenance of the switch gear and electrical plant. Something is constantly getting out of order, necessitating renewals, perhaps at awkward moments, and proving in the aggregate fairly expensive. These troubles it will be found, are due to the sulphur in the atmosphere, which attacks the switch contracts, and also affects the insulation of the windings of the machines.

So far it has been found practically impossible to prevent the sulphur laden atmosphere getting to the windings of alternators, but, of course, the switch gear and transformers, etc., may be placed some distance away from the engines, and further protected by being immersed in oil. These simple precautions usually prove effective. But the question of protecting the insulation of windings has still to be solved. This is one of a number of small points of which account has to be taken when installing gas engines, but which advocates of gas engines for any and every purpose generally omit to mention.

This is the wrong spirit in which to approach such problems, in this instance, proving harmful to the advance or the use of both class of apparatus. What is required is further experimentation, both with standard materials and with substitutes therefor.

Experience has of late taught that it is a mistake to assume that any one substance is the inevitable and the only one suitable for any special purpose. Actual practice has for years been handicapped by accepting certain existing conditions as those which must limit the work in hand. Other methods and substitute materials, which have long been held taboo, have been used under the stress of circumstances and discovered to work very well. It is, therefore, unwise to assume that the producer gas is hopelessly inimical to the working of electrical plant in close proximity.


Diameter of Pulley.
Surface Speed of Belt in Feet per Min.
Rev. per Minute.
1st. driving pulley
2nd. driving pulley
1st. driven pulley
2nd. driven pulley
D. = dia. of driver in inches.
R rev. per min. of driver.
d = dia. of driven in inches.
r. = rev. per min. of driven.
S. = surface speed in ft. per min.
F. = final speed of compound drive.
D R = d r
D d = r : R
D = d r / R
R = d r / D
d = D R / r
r = D R / d
S = 3·1416 D R / 12 = ·2618 D R
F = R D D' / d d'

TRANSMISSION SPEED DATA CHART.

TRANSMISSION SPEED DATA CHART

By J. H. R.

PRACTICAL problems involving the application of arithmetical calculations are often encountered in machine shop work. The solution of many of these apparently perplexing operations is invariably left to the foreman of the department, partly because he is responsible for that particular duty, but more often for the reason that a large number of the men under him do not, or possibly will not, acquire the necessary knowledge to perform the mental tasks that are unquestionably the foundation of the very work they are engaged in. It is a deplorable fact that a large number of workmen have neglected to retain the learning of their earlier days, when their school tasks were more of a mental than a physical character. There are also others that are unconsciously supplied with the potential requirements, but fail to see where they can make practical application of this elementary yet fundamental knowledge.

Calculations for the speeds of shafting, and the diameters of the pulleys by which the speeds are determined, are probably among the most frequent problems met with in general machine shop practice. Work of this character resolves itself down to simple proportion, or the rule of three where the equation of two ratios comprises the basis of operations. For instance, a line shaft running 200 revolutions per minute, is fitted with an 18 inch pulley and it is required to drive a countershaft at a speed of 120 rev. per

min.; what must be the diameter of pulley on the latter shaft? As pulleys derive their motion from the connecting belt it is obvious that the surface speed of coupled pulleys must always be the same (neglecting slippage). However, as the circumferences of pulleys vary directly as their diameters, it is the practice to use the latter in the calculations, therefore, as the speed of the known pulley is equal to $18 \times 3.1416 \times 200$, the diameter of the required pulley will be this value divided by the product of the speed and the constant 3.1416, or $\frac{18 \times 3.1416 \times 200}{129 \times 3.1416} = 30$ inches. It will be noticed that the value 3.1416 is common to both the numerator and the denominator, thus the practice of eliminating this factor.

The accompanying chart illustrates a convenient method of finding the various values of pulleys, shafts and belt speeds in transmission problems. The left hand column represents the diameters of pulleys in inches; the middle column indicates the belt speeds in feet per minute; and the right hand scale denotes the speed of the shaft in revolutions per minute.

To illustrate the operation of the chart we will suppose that the line shaft has a running speed of 180 rev. per min., and is fitted with a 60 inch pulley. applying a scale or fine taut thread from the points on the two outer scales, it will be found that the line intersects the middle column at the graduation between 2800 and 3000—the actual value by calculation being 2827—this being the surface speed of the belt. As the diameter of the driving pulley must necessarily determine the belt speed, it is evident that the coupled pulley will have a similar surface speed. Therefore by using the straight edge and connecting the intersection of the middle line with a certain diameter of pulley (in this case 20 inches), we find the speed of the second shaft to be 540 rev. per min. To compound this drive by using a second set of pulleys we continue as before. Connect the last found value (540 revs.) with the second driving pulley diameter, 30 inches, and through the intersection of the middle scale, connect with the final speed desired (in this particular case 2800 revs. per min.), and we at once find 5¾ inches as the diameter of the second driven pulley.

In the lower left hand corner of the chart are given the necessary data and formulae to solve for the various values. It will be noticed that the product of the speed and the diameter of a pulley on one shaft always equal the product of the speed and diameter of a pulley on another shaft, when the two are belted together. It will also be noted that the diameters are in inverse proportion to their respective speeds, that is, the smaller of a pair of coupled pulleys will always run the faster. The surface speed of the pulley, which is likewise the belt speed, can be found by using the formula, $S = \frac{3.1416\ D\ R}{12}$

.2618 D R.

Example:—To find the belt speed of a drive when the driving pulley is 28 inches in diameter and running at 225 rev. per min., the solution would be $S = .2618\ D\ R$ $.2618 \times 28 \times 225$ 1649 feet per minute. In a compound drive, where it is desired to find the final shaft speed and the various pulley diameters are known, also the speed of the driving shaft, the formula:— $F = \frac{R\ D\ D'\ D''}{r\ r'\ r''}$ is used. Suppose the line shaft runs at a speed of 160 revs. per min., and the driving pulleys have diameters of 36 inches, 30 inches and 20 inches, with driven pulleys of 24 inches, 18 inches and 6 inches, the resultant speed of the final shaft would be:—

$$F = \frac{R\ D\ D'\ D''}{r\ r'\ r''} \qquad \frac{160 \times 36 \times 30 \times 20}{24 \times 18 \times 6}$$

1333 rev. per min. nearly.

AEROPLANE MANUFACTURING ACTIVITY IN ENGLAND

THE growing importance of the aeroplane and its probable influence, through a vigorous reprisal policy, on the final stages of the war, were emphasized during a recent visit by Lord Montague to an aeroplane works in West London. According to The Engineer, to whom we are indebted for the illustrations of aeroplane manufacture reproduced in this issue, the workers were reminded that the need for expediting the output of aircraft is more necessary at this juncture than at any previous period. On the preparation now made in connection with the provision of the necessary number of aeroplanes for raiding enemy territory much will depend in the concluding phases of the war.

In connection with possible day raids by aeroplanes on England, Lord Montagu has received assurances which suggest that all necessary provision for defence has been made, but the only way of dealing with night raids by aeroplane is by destroying enemy aerodromes within flying distance of London and the

VIEW OF WING CONSTRUCTION IN AN ENGLISH AEROPLANE FACTORY.

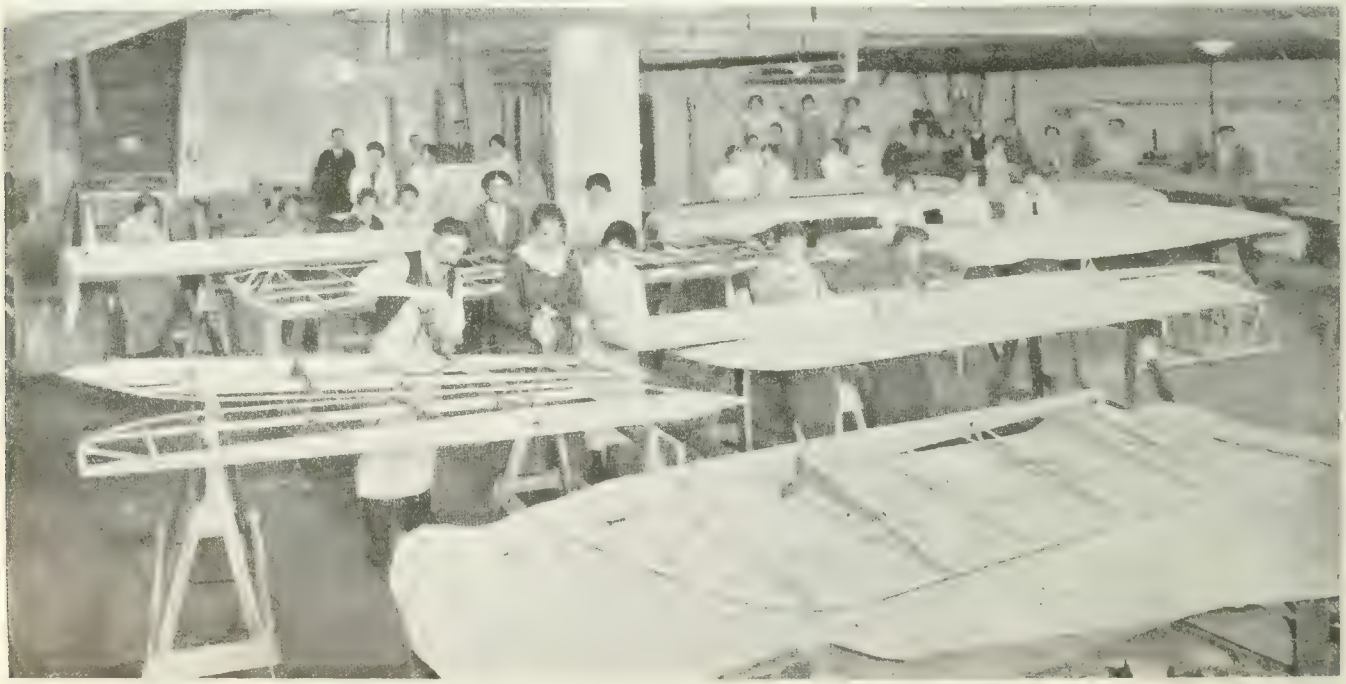
WING FRAMEWORK IN AN ADVANCED STAGE OF CONSTRUCTION.

East and South Coasts, and generally carrying the air war into enemy territory. In Germany the labor resources formerly employed in Zeppelin construction have now been diverted to aeroplane manufacture, and the training of German airmen in night flying is receiving unremitting attention. These things portend the opening of a new phase of the aerial war.

What is being done at these particular factories in West London is typical of the general effort being made to meet the new enemy threat, and the illustrations indicate the remarkable progress in manufacturing capacity which has been made in the course of a few months. Beginning about twelve months ago with little more than a score of hands, the principal output during the early period was ammunition boxes and cases for aeroplane engines. To-day these works, which comprise sixteen shops having a superficial area of 58,000 ft., employ 1,000 hands, of whom about one-fourth are women workers, whose energies are devoted to the manufacture of aeroplanes and their parts.

THE BEGINNING OF MECHANICAL REFRIGERATION

THE original air refrigerating machine was brought out in 1845 by Dr. Gorrie, of New Orleans, who with Dr. Cullen felt a special need of artificial refrigeration in the aid of his profession. This mechanism had a cylinder in which the air was first compressed. It was passed from this cylinder to a chamber cooled by running water where a pressure of fifteen pounds per square inch above that of the atmosphere was maintained. The air was already cooled partly during compression by the injection of water, the cooling chamber receiving in reality a mixture of air and water. This on passing to another cylinder was expanded down to something like atmospheric pressure. While expanding it was mixed with brine injected into the cylinder, the low temperature of the expanding air communicating itself to the brine. The air on leaving this cylinder was allowed to escape to the atmosphere while the brine, now cooled to 20 deg. F., was conveyed into a tank and applied to ice making.—Edison Monthly.



AEROPLANE WINGS RECEIVING THEIR FABRIC COVERING. THE CONSTRUCTION OF A WING IS CLEARLY SHOWN HERE.

PROGRESS IN NEW EQUIPMENT

There is Here Provided in Compact Form a Monthly Compendium of Shipbuilding and Marine Engineering Auxiliary Product Achievement

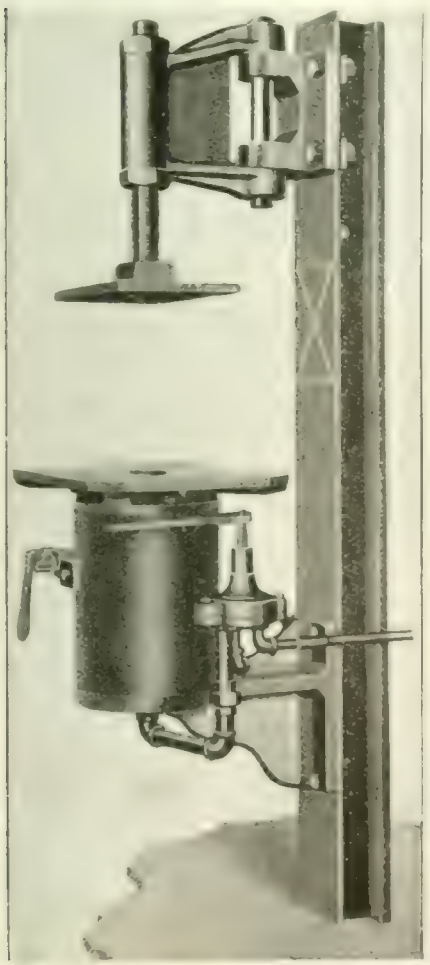
NEW SQUEEZER MOULDING MACHINE

THE moulding machine illustrated in the accompanying engraving is of the squeezer type, and has been specially designed to combine speed, efficiency, simplicity, and fool-proofness. The Rapid moulding machine is the product of the Federal Malleable Co., West Allis, Wis., who have developed it during the past two years so as to enable it to be operated by unskilled moulders over a wide range of work.

Highly refined features have been avoided, and rapid and simple adjustment provided, whereby castings may be made varying in weight from considerably less than an ounce to over fifteen pounds in weight.

The bench plate is 21 in. long by 14 in. wide, while the squeezer head is 14 in. long by 8 in. wide. Maximum adjustment between squeezer head plate and bench plate is 15 in. The cylinder has a bore and stroke of 8 in. by 5¼ in., and operates at from 65 to 85 lbs. pressure per sq. in., 80 lbs. being recommended for general use. The shipping weight is 800 lbs.

These machines are fitted with the Rapid operating valve, which is self-seating and leak-proof.



SQUEEZER TYPE OF MOLDING MACHINE WITH RAPID ADJUSTMENT FOR WIDE RANGE OF WORK.

IMPROVED TYPE OF PISTON RING

CYLINDER efficiency is one of the chief essentials in the successful operation of any type of pump or engine, be it air, gas, steam or hydraulic. The one outstanding feature in engine construction that has received more thought and attention than any other is the piston. The effective power of an engine is largely dependent upon the free running movement of the piston and the total absence of leakage, either when driving or under compression. This effect is only assured when the piston rings have been accurately fitted in their respective grooves, and even then the durability is more or less uncertain, owing to the variable conditions.

In the accompanying illustration is shown an interesting and highly serviceable type of piston ring, designed by E. Duchesne, Montreal, and being made in various sizes to suit any make of cylinder, from motorcycles and automobiles to locomotives and marine engines. In the design of these rings, several features have been incorporated to increase and maintain the efficiency of the engine, and also extend the useful life of the rings themselves. In the ordinary one piece split ring, the pressure against the cylinder wall is obtained by the spring in the ring itself. The special rings here described not only contain their own initial spring, but are prevented from any possibility of "setting" by the action of the inside wedge ring, which is made from special spring steel The construction prevents this interior ring from coming in contact with any of the friction surfaces; its essential purpose is to maintain a constant but flexible pressure of the cast iron rings against the cylinder bore. In addition to the radial thrust, the 60 deg. bevel of the spring ring acting against a similar bevel on the inner middle edges of the friction rings assures a perfect fit on the sides of the groove, resulting in a permanent fit irrespective of any subsequent wear.

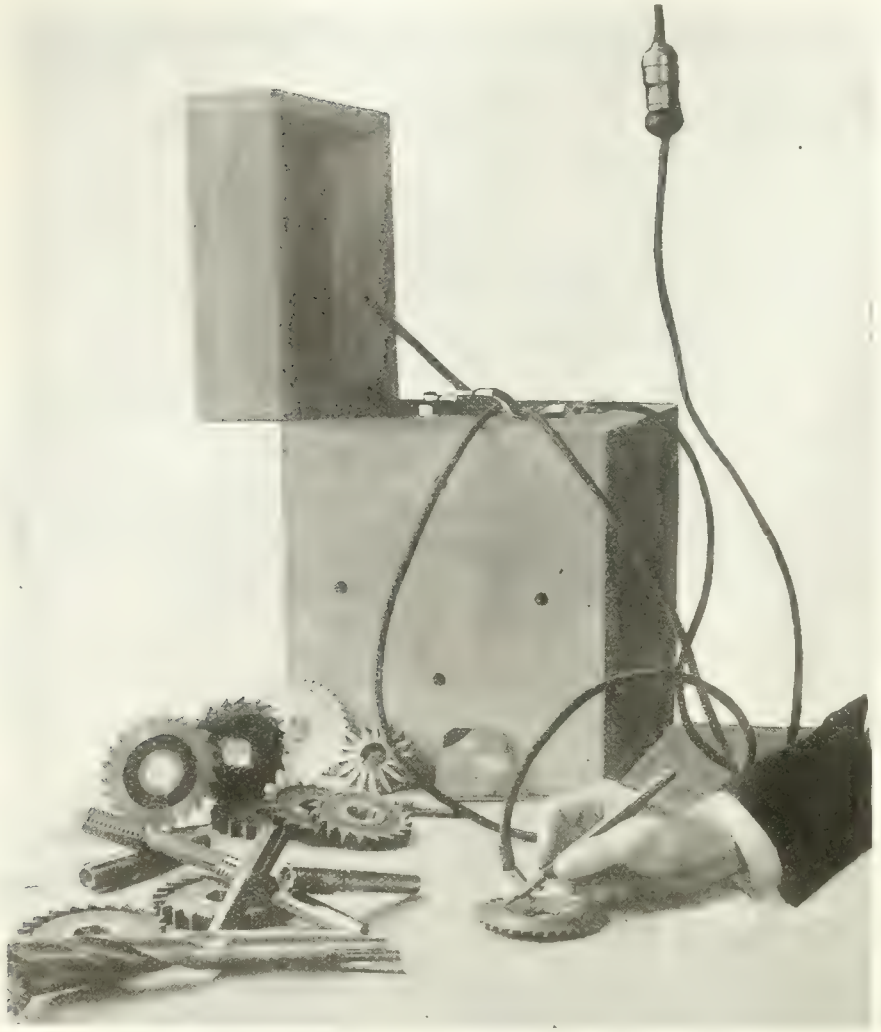
With a one-piece ring the lateral fit is often so good that any slight binding of the sides prevents the free radial movement of the ring, when the same is passing over imperceptible irregularities of the cylinder bore; or, after becoming worn, will allow the steam or gas to "wire draw" down the sides and below the rings. The three-piece rings here shown have the distinct advantage that they will adjust themselves to the above conditions and entirely eliminate binding or wire drawing. It may be also stated that the possibility of the gas or steam leaking down the sides and below the rings is reduced to the minimum in this type of ring, as the action of the inner spring forces the two outer portions firmly against either side of the groove, thus avoiding any space where the gases could enter and thereby increasing the engine efficiency. Another highly interesting feature in the manufacture of these "Wedgerite" piston rings is the softer grade of cast iron than is generally used for the purpose. Where it is necessary, as in the one-piece ring, to rely upon the spring of the friction ring to maintain contact on the cylinder walls, it was the practice to use a hard iron to insure a durable spring, but the adoption of the spring steel ring permits a softer iron in these special piston rings, which minimizes the wear upon the bore of the cylinder. These rings are cast independently and ground to the desired dimensions and eccentricity. Vincent & Morris, Montreal, are placing this article on the market.

DOUBLE TYPE OF PISTON RING WITH BEVELLED SPRING SUPPORTING RING.

ETCHOGRAPH APPARATUS FOR MARKING TOOLS

THE elaboration of modern shop systems, along with the multiplicity of small tools, fixture parts, etc., has accentuated the unsatisfactory features of marking accessory equipment by the acid etching process. In addition to the time required for applying wax, etching, putting on acid, and subsequent cleaning, etc., the work demanded more skill and patience than usually possessed by the ordinary workman, the necessary feature of legibility being frequently almost absent.

All of these handicaps have been completely removed by the apparatus shown in the engraving herewith, which requires nothing further save an ordinary light socket and reasonable penmanship. It is known as the Etchograph and consists of a special pencil wired up to a trans-



ETCHOGRAPH APPARATUS WHICH MARKS HARDENED STEEL TOOLS AND MACHINE PARTS WITHOUT ACID OR OTHER SUBSTANCES.

former as shown. When the current (110 volt alternating) is turned on, and the article placed on one terminal, the pencil is used for writing with in any required style, the only limitation being the skill of the operator. The work is done as quickly as ordinary writing and requires no liquids or other materials except the work itself. Any width of line, any style or size of letters, figures or design, and any size of tool, gauge or fixture may be marked as described.

Power is used only when etching, and if direct current only is available a D.C. —A.C. generator is furnished at reasonable cost. The transformer supplied is an Adams-Bagnall, and the outfit is being marketed by William Brewster Co., Inc., New York.

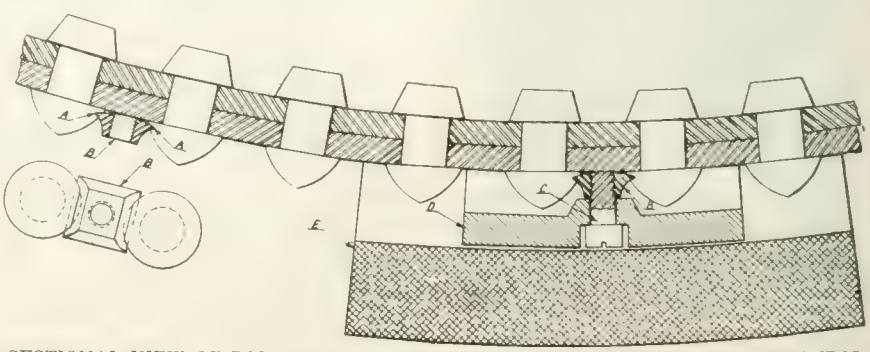
BOILER GIRTH SEAM PROTECTORS

A TROUBLE always present in horizontal tubular boilers is that arising from cracks on the boiler shell surface, directly above the fire chamber. These defects invariably originate at the girth seam, which, owing to the general construction of this type of boiler, is located immediately above the fire, where it is exposed to intense heat. The heat in itself is not the objectionable feature, but owing to the necessity of opening the fire box door to replenish the fire, this portion is subjected to continually varying stresses, caused by the frequent expansion and contraction of the plates. In an effort to minimize this trouble boilers have been designed where the section exposed to the high temperature of the fires, has been made in one piece, to bring the seam in a position out of the direct action of the hot gases. Owing, however, to the great area required, this method has not given satisfaction, and the seam has still remained more or less a source of trouble and inconvenience.

A simple device for preventing the formation of fire cracks that has been recently perfected, and for which patents have been granted, has been placed on the market, and installed on a large number of boilers, both in the United States and Canada with remarkable results. It is claimed that a boiler equipped with this seam protector will be permanently protected from all danger of fire cracking and subsequent leakage resulting therefrom; an unprotected seam that has developed a leak can be caulked tight and fitted with this device, and the claim is made that the seam will remain dry indefinitely. The illustrations herewith show a general view of the detached parts and the method of applying to the boiler shell. It will be seen that the application of this seam protector is very simple and that it does not interfere with the heating qualities or detract from the strength of the seam. As a matter of fact, the construction of the protector, with the large semi-circular sections of fire brick or reinforced asbestos, provides a reserve of heat that prevents any sudden reaction in the seam when the fire door is opened or closed. As the cold outside air from the open door or the hot gases from the fire are not permitted to come in direct contact with the boiler seam, the effect is to retain a uniform temperature on the outer lap, thus avoiding sudden or violent contraction or expansion of the lap.

In addition to preventing exterior fire cracks, it has been demonstrated that the accumulation of sediment along the edge of the inner lap, and about the heads of the rivets—a condition that is generally the cause of interior mud cracks—is largely, if not entirely eliminated, as the retaining of a more uniform temperature at this particular point has shown the tendency to prevent the formation of injurious muddy scale that bakes to this portion of the seam, when the same is exposed to the direct action of the fire. It is thereby claimed that these protectors have made the weakest portion of the boiler equally as strong and durable as any other part.

In fitting this boiler seam protector to units already in service, two adjacent rivets, at suitable distances apart, on the girth seam, are notched by means of a special diamond point chisel as shown at AA to receive the wedge nut B, this being made a snug fit. When same is in position, the metal lug or tile support D is attached by means of a small ½ in. bolt C. When this is firmly placed, the



SECTIONAL VIEW OF BOILER SEAM PROTECTOR SHOWING METHOD OF ATTACHING TO RIVET-HEADS.

fire brick or asbestos tile E is slid over the extending lugs of the cast iron piece D. Each one of these units is placed approximately 9½ in. apart, and five or more may be required to cover the length of the affected seam. This seam protector is not only used on stationary boilers, but is applicable to all fire exposed seams on locomotive and marine boilers. These seam protectors are manufactured in Canada by the National Boiler Protector Co. of Canada, 382 St. James Street, Montreal.

ECONOMICAL USE OF FUEL URGENT

TALKING to a [illegible] of men who are to assist the Fuel Administration in the different States, at their meeting in Washington with Dr. H. A. Garfield, Van H. Manning, director of the Bureau of Mines, Department of the Interior, said concerning the necessity of urging the economical use of fuels:

"The economical use of fuel has proved to be no simple problem. The coal, the equipment, and the human variables make hard and fast general rules impossible. The Bureau of Mines has carried on extensive experiments to determine the fundamental principles of the combustion process and of furnace design, and, at the same time has been making practical application of improved practice in government power plants. Many publications are available which show the progress of the work along these lines. Americans have been as wasteful of coal as of other resources, largely because coal has been abundant. To many consumers it has seemed hardly worth while to give time and thought to the saving of coal.

"Conditions have suddenly changed. To-day it is everybody's business to save coal. Coal is the foundation stone of industry. Without it the production of equipment for war must halt. Transportation facilities must stand still. One man's careless and wasteful use may mean an idle factory or a cold house for his neighbor. With the world looking to us largely for its coal supply, with increased demands at home, with a scarcity of available labor, with overtaxed transportation facilities, the consumer of coal must pause and give serious consideration to the problem which confronts the country.

Saving Through Intelligent Consumption

"If the consumers can be aroused to an intelligent consideration of the burning of coal, they can begin to save ten per cent. of the production, (600,000,000) at once. With more effort, through instruction and a moderate remodeling of coal burning equipment, which could all be accomplished during the war, a further considerable saving can be made. The possible coal saving when present practice is compared with the best ideal practice is very large. If it were possible to supply the need of this country for light, heat, and power, through the highest type of mechanical devices, and if we could make a skilled coal user out of the average user, we could probably get along with half as much coal as we are now consuming. This ideal is far beyond present realization.

"The immediate problem is a difficult one. We cannot scrap all out-of-date power plants. We must start by doing the best with what we have. We must begin saving coal at once. The problem is personal. It deals with the human element. We must reach the man with the shovel.

Household Consumption

"About fifteen million people shovel the twenty per cent. of our coal used for domestic purposes. Only about two hundred and fifty thousand firemen shovel the sixty-odd per cent. of our coal used by power plants and railroads. While we must appeal to the householder to serve coal it is vastly more important to reach the fireman through whose hands the larger part of our coal passes.

"The householder must realize that when he throws a shovelful of anthracite coal into his furnace its value is equivalent to half a pound of sugar, or half a loaf of bread, or a pint of milk. He must appreciate that it is worth while to examine his house and to overhaul his heating equipment. Weather strips, double windows, pipe coverings, clean flues and chimneys, and tight fittings in ash-pit, doors, dampers and furnace parts will all pay. Damper control is one of the chief secrets of economical heating. Clean surfaces are most essential, as soot is a poorer conductor of heat than asbestos. Care, attention, and taking pains will be the greatest factors in saving domestic coal.

The Steam Plant Fireman

"The fireman is, however, the biggest single factor to be considered in a campaign to secure the largest saving of coal. Many manufacturers have made a serious mistake in failing to consider the fireman as a skilled worker. Too often he is treated as a roustabout. He is not well instructed nor given proper labor saving devices. As coal increases in price, or becomes difficult to get, the fireman handles more and more of his employer's money. His efficiency means more in dollars and cents. This is an encouraging feature in the situation. It means a better recognition of the importance of the fireman, more efficient work on his part, and a consequent increased saving of coal. The viewpoint is changing. It is no longer cheaper to pay for the coal than to educate the firemen.

"In carrying out a campaign to promote the saving of coal, let the appeal be made to the householder to cut down his consumption in every way possible, but above all, give serious consideration to methods by which a systematic relationship may be established between the office and the fireman. Encourage the manufacturer to take a keener interest in his fuel consumption and to back up his fireman by giving him the best information and equipment available. This problem has two phases, first to arouse the interest of the manufacturer and his engineer and fireman, and to point out the part which they can play in relieving the present crisis in coal supply; second, to furnish whatever technical information may be desirable and which will be immediately applicable to accomplish the result sought."

Screenings

A sentry, an Irishman, was on post duty for the first time at night, when the officer of the day approached. He called, "Who comes there?"

"Officer of the day," was the reply.

"Then what are you doin' out at night?" asked the sentry.

He was a very young British subaltern and the son of a general, which fact he never ceased to rub in. One day he was sent with a message from the general to the gunners. "If you please," he said to the major, "father says will you move your guns?" Now it happened that the major was in a very irate mood. "Oh," he snapped out, "and what the deuce does your mother say"

Two Tommies, one a giant and the other a dwarf, were digging trenches. An N.C.O. came to see how they were getting on, and noticing one of them doing more work than the other, he called down to the big fellow.

"Hi, you! How is it that little Jenkles, who is only half as big as you, is doing twice as much work?"

Glancing down at Jenkles the giant replied:

"And why shouldn't he, ain't he nearer to it?"

The class was being instructed in the mysteries of mental arithmetic. "Now, Robert," said the teacher, "supposing your father owed the butcher $29.30, the baker $30.40, the greengrocer $6.70, the milkman $2.10, and the coal man $16.90, what would that come to?" Robert was not a bright pupil, and the teacher was prepared to repeat the sum once or twice, but to her surprise Robert was ready with his answer. "It would come to a flitting, mum," he said.

Johnny was crying in the hall as his mother came along, hatted and coated. She asked what had happened.

"You are going away; and so is papa!" Johnny sobbed.

"Why, child, I shall be away two or three days, but father is not going away!"

"Yes, he is!" cried Johnny. "Hes going to Rome."

"Rome? What do you mean, dear?" asked the surprised mother.

"He said to-day to Mr. Brown that he would make Rome howl when you left!"

"Indeed- Well, dear, I sha'n't leave you now."

The MacLean Publishing Company
LIMITED
(ESTABLISHED 1888)
JOHN BAYNE MACLEAN - - - - - - - President
H. T. HUNTER - - - - - - - - - Vice-President
H. V. TYRRELL - - - - - - - - General Manager
PUBLISHERS OF

CANADIAN MACHINERY
AND MANUFACTURING NEWS

A weekly newspaper devoted to the machinery and manufacturing interests.
PETER BAIN, M.E., Editor. B. G. NEWTON, Manager.
Associate Editors
A. G. WEBSTER J. M. WILSON J. H. RODGERS

Office of Publication, 148-153 University Avenue, Toronto, Ont.

Vol. XVIII. OCTOBER 18, 1917 No. 16

INDUSTRIAL SITUATION SOUND, ALTHOUGH UNSETTLED

CONTINUED activity in Canada's munition industry on a scale that will compare more or less favorably with the operations of the past thirty months appears to be largely if not wholly dependent on the ability of our Government to finance contracts available through the Imperial authorities. It is not surprising, therefore, if just a tinge of uncertainty marks the immediate outlook, besides tending to a restraint of commitments as regards both investment in or development of manufacturing enterprise. There is not a little apprehension apparent concerning the future of our steel industries, and if one would judge by the steady, although slow, downward trend of steel security values, uncertainty is being given a definite practical demonstration.

There is a disposition, however, to over-estimate the effect that contraction of our munitions industry is having or is likely to have during the next three or probably six months on our steel output. It is true that shell-making is now largely confined to one size only, i.e., the 6-inch high explosive projectile. Steel contracts with our several mills have not, as a result, been cancelled or trimmed as might have been expected or as may be unwittingly assumed. The now general concentration on the output of one size and type projectile has meant simply the switching of the steel production of our mills to that end, in other words, the unfilled balance of steel quantity orders placed several months ago is to enter wholly into 6-inch high explosive shell manufacture.

There is apparent an increasing tendency to caution on the part of the spending public, and this is having some effect on consumer demand in all lines of manufacturing enterprise. From a national point of view such a circumstance cannot be considered otherwise than healthy. It has been suggested that the spirit of caution referred to may reflect a popular desire to participate in the coming Victory Loan; our own view, however, is that of individual self-protection against the inevitable "rainy day." While there has been a substantial curtailment of shell machining orders, affecting in the natural course of things many firms with equipment unsuitable for 6-inch shell production, unless they launched out into large expenditures to participate in the latter, a proceeding the profitable outcome of which is problematical, there is every reason to believe that the monthly disbursement of something like $30,000,000 on shell contracts is little likely to suffer restriction, much less elimination altogether for many months to come.

The present situation is not without its bright spots. Not only are Canadian manufacturers securing what may be termed overflow orders in quantity from the United States bearing on the war preparations there, but for the latter reason also, numbers of our metal-working plants whose shell-making activities have ceased, are finding a profitable market for the disposal of their specialized equipment instead of having it left on their hands as had confidently although regretfully been anticipated.

Shipbuilding continues active, but not nearly so much so nor on so comprehensive a scale as the exigencies of the situation and the wealth of opportunity warrant. The number of vessels contracted for and building in our various plants reaches a fair total, as do also the launchings, although the latter for the present year will include many craft altogether distinctive from the much needed ocean-going freighter. Our export trade is now, to a large extent, dependent on "bottoms," and will be trebly so at least when all menace of the seas has been removed. Our plant capacity has nevertheless been but little developed, while the immediate outlook for a determined effort to that end is none too bright.

We accepted munitions-making as but temporary in its sojourn, yet we went into it so whole-heartedly as to both astonish ourselves, our neighbors, our friends and our enemies with the results achieved. Shipbuilding, on the other hand, in spite of its known high-degree permanence as a staple industry, has not as yet developed the equivalent of the munitions enthusiasm, and may possibly fail to do so while the difficulty of securing materials of construction continues. The strongest possible support—Government and individual, financial and otherwise—should be made immediately available for the propagation of this very desirable industrial enterprise, in view of the fact that much of our future success in a commercial sense is thereon dependent. The issues are sufficiently momentous to make the subject of supreme national importance, second only to the otherwise successful prosecution of the war besides being co-related to it.

LABOR AFTER THE WAR

THERE can be no doubt but that the greatest of after-war problems will be the relations between capital and labor. Men are now being paid wages for munitions and other war-time work which has raised the level of the market to previously unheard of levels. True much of the increased return has been absorbed by the higher cost of living, but in the period after the war, when munitions work stops—when the nations now spending so recklessly start to retrench—the present returns for labor cannot be expected to last. The crux of the situation will be that industrial wages will decline more rapidly than will the cost of living and the civilian individual will then feel the pinch of war conditions, which, generally speaking, he has been far from doing up to the present time.

When the demand for munitions ceases and there is still a shortage in the world food supply, Canada should take her place in the sun to a greater extent than ever as a producer of foodstuffs. For a time at least, especially with the return of the troops, the movement of population promises to be from the urban centres to the rural districts, just as it was the opposite for months after war industrial activity commenced, and not a little evidence is already forthcoming that a "back to the land" movement of fair proportions is gaining momentum and popularity.

INDUSTRIAL NOTABILITIES

EBENEZER CARNEGIE, Hon. Colonel, president Electric Steel & Metals Co., Ltd., Welland; managing-director Electric Steel & Engineering Co., Ltd., Welland; director British Forgings, Ltd., Toronto, Ont., was born in Aberdeen, Scotland, Sept. 7, 1881, son of David and Margaret (Bruce) Carnegie.

He was educated at the Lasses Grammar School and City of London College, supplemented by private tuition.

EBENEZER CARNEGIE.

Mr. Carnegie began his career as apprentice engineer with J. Richmond & Sons, London, 1898-1900; engineer improver, Vickers Sons & Maxim, Erith, Kent, 1900-1903; experimental gun work, Royal Arsenal, Woolwich, 1903-1906; designing and erection of plant, Cammell, Laird & Sons, Sheffield, 1906-1907; assistant engineer, Thomas Firth & Sons, Sheffield, 1907-1910.

During 1910-1913, Mr. Carnegie was manager and technical advisor of the Gram-o-phone Co., London, and in 1913 he organized the Electric Steel & Metals Co., becoming secretary and general manager; elected vice-president 1914; appointed president 1916.

Mr. Carnegie was also a member of the Shell Committee; member Munitions Resources Committee; member Parliamentary Executive Committee, Sheffield, Eng., 1907-1909.

Golf and motoring are his principal recreations, while his clubs are National (Toronto); Engineers (Toronto); Welland (Welland). In politics he is Independent, and in religion Presbyterian.

Mr. Carnegie's residence is Parkway, Welland, Ontario.

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON.

Grey forge, Pittsburgh	$46 50
Lake Superior, charcoal, Chicago	58 00
Standard low phos., Philadelphia	87 00
Bessemer, Pittsburgh	37 25
Basic, Valley furnace	33 00

	Montreal	Toronto
Hamilton		
Victoria	60 00	

FINISHED IRON AND STEEL.

Per lb. to Large Buyers.	Cents
Iron bars, base, Toronto	5 25
Steel bars, base, Toronto	5 50
Steel bars, 2 in. to 4 in. base	6 00
Steel bars, 4 in. and larger base	7 00
Iron bars, base, Montreal	5 25
Steel bars, base, Montreal	5 50
Reinforcing bars, base	5 25
Steel hoops	7 50
Refined iron	5 50
Norway iron	11 00
Tire steel	5 50
Spring steel	7 00
Band steel, No. 10 gauge	5 75
Chequered floor plate, 3-16 in.	15 20
Chequered floor plate, ¼ in.	15 00
Staybolt iron	8 50
Bessemer rails, heavy, at mill	38 00
Steel bars, Pittsburgh	4 00
Tank plates, Pittsburgh	4 00
Structural shapes, Pittsburgh	4 00
Steel hoops, Pittsburgh	5 75
F.O.B. Toronto Warehouse.	
Steel bars	5 50
Small shapes	5 75
F.O.B. Chicago Warehouse	
Steel bars	5 00
Structural shapes	5 00
Plates	8 00

FREIGHT RATES.

Pittsburgh to Following Points

	Per 100 lbs. C.L.	L.C.L.
Montreal	23.1	31 5
St. John, N.B.	35.1	45 5
Halifax	35.1	45.5
Toronto	18 9	22 1
Guelph	18 9	22 1
London	18.9	22.1
Windsor	18.9	22 1
Winnipeg	64 9	85 1

METALS.

	Montreal	Toronto
Lake copper	$31 00	$32 00
Electro copper	31 00	32 00
Castings, copper	30 00	31 00
Tin	63 00	63 00
Spelter	10 50	10 50
Lead	11 00	10 75
Antimony	18 00	19 00
Aluminum	65 00	62 00

Prices per 100 lbs.

PLATES.

	Montreal	Toronto
Plates, ¼ to ½	$13 00	$13 00
Heads	13 30	13 30
Tank plates, 3-16 in.	13 65	13 25

WROUGHT PIPE.

Effective July 5, 1917.

Size.	Black Standard Buttweld. Per 100 feet	Galvanized Standard Lapweld. Per 100 feet
⅛ in.	$ 5 00	$ 6 50
¼ and ⅜ in.	5 12	7 16
½ in.	6 46	8 03
¾ in.	8 17	10 29
1 in.	12 07	15 22
1¼ in.	16 33	20 59
1½ in.	19 53	24 61
2 in.	26 27	33 12
2½ in.	42 12	52 94
3 in.	55 08	69 23
3½ in.	69 92	86 94
4 in.	82 84	103 00
2 in.	29 23	35 71
2½ in.	43 88	54 11
3 in.	57 38	70 76
3½ in.	71 76	89 70
4 in.	85 02	106 28
4½ in.	96 52	121 29
5 in.	112 50	141 34
6 in.	145 90	183 36
7 in.	190 40	238 00
8 L in.	200 00	250 00
8 in.	230 40	288 00
9 in.	276 00	345 00
10 L in.	256 00	320 00
10 in.	329 60	412 00

Prices—Ontario, Quebec and Maritime Provinces.

WROUGHT NIPPLES.

4" and under, 45%.
4½" and larger, 40%.
4" and under, running thread, 25%.
Standard couplings, 4" and under, 35%.
4½" and larger, 15%.

OLD MATERIAL.

Dealers' Buying Prices.

	Montreal	Toronto
Copper, light	$19 00	$18 00
Copper, crucible	22 50	20 50
Copper, heavy	22 50	20 50
Copper wire	22 50	20 50
No. 1 machine composition	20 00	18 00
New brass cuttings	16 00	17 00
No. 1 brass turnings	15 00	15 75
Light brass	12 00	10 00
Medium brass	16 00	14 00
Heavy brass	16 00	16 00
Heavy melting steel	21 00	17 00
Steel turning	12 00	8 00
Shell turnings	12 00	12 00
Boiler plate	23 00	18 00
Axles, wrought iron.	30 00	24 00
Rails	26 00	18 00
No. 1 machine cast iron	25 00	25 00
Malleable scrap	20 00	20 00
Pipe, wrought	15 00	9 00
Car wheels, iron	26 00	25 00
Steel axles	32 00	30 00
Mach. shop turn'gs.	8 50	8 50
Cast borings	15 00	8 50
Stove plate	19 00	19 00
Scrap zinc	5 00	6 50
Heavy lead	7 50	9 00
Tea lead	6 50	7 00
Aluminum	30 00	25 00

BOLTS, NUTS AND SCREWS.

	Per Cent.
Carriage bolts, ⅜" and less.	10
Carriage bolts 7-16 and up	net
Coach and lag screws	25
Stove bolts	55
Plate washers	List plus 20
Machine bolts, 7-16 and over	net
Machine bolts, ⅜ and less	10
Blank bolts	net
Bolt ends	net
Elevator bolts	5
Machine screws, fl. and rd. hd., steel	27½
Machine screws, o. and fil. hd., steel	10
Machine screws, fl. and rd. hd., brass	add 20
Machine screws, o. and fil. hd., brass	add 25
Nuts, square blank	add $1 50
Nuts, square, tapped	add 1 75
Nuts, hex. blank	add 1 75
Nuts, hex. tapped	add 2 00
Copper rivets and burrs, list plus	30
Burrs only list plus	50
Iron rivets and burrs	17½
Boiler rivets, base ¾-in and larger	$8 50
Structural rivets, as above	8 40
Wood screws, flat, bright	72½
Wood screws, O. & R., bright	67½
Wood screws, flat, brass	37½
Wood screws, O. & R., brass	32½
Wood screws, flat, bronze	22½
Wood screws, O. & R. bronze	25

MILLED PRODUCTS.

	Per cent
Set screws	25
Eq. & Hex. Head Cap Screws	20
Rd. & Fil Head Cap Screws	net
Flat ⅞ But. Hd. Cap Screws plus	25
Fin. & Semi-fin. nuts up to 1 in.	25
Fin. and semi-fin. nuts, over 1 in., up to 1½ in.	20
Fin. and semi-fin. nuts, over 1½ in., up to 2 in. plus	10
Studs	20
Taper pins	40
Coupling bolts, plus	10
Planer head bolts, without fillet, list plus	10
Planer head bolts, with fillet, list plus 10 and	10
Planer head bolt nuts, same as finished nuts.	
Planer bolt washers	net
Hollow set screws	list plus 20
Collar screws	list plus 30, 10
Thumb screws	20
Thumb nuts	65
Patch bolts	add 40, 10
Cold pressed nuts to 1½ in.	add $4 50
Cold pressed nuts over 1½ in.	add $7 00

BILLETS.

	Per gross ton
Bessemer billets	$ 60 00
Open-hearth billets	60 00
O.H. sheet bars	70 00
Forging billets	90 00
Wire rods	85 00

F.o.b. Pittsburgh.

NAILS AND SPIKES.

Wire nails	5 50	5 45
Cut nails	5 70	5 80
Miscellaneous wire nails		60%
Spikes, ⅜ in. and larger		7 50
Spikes, ¼ and 5-16 in.		8 00

MISCELLANEOUS.

Solder, strictly	0 36
Solder, guaranteed	0 38½
Babbitt metals	18 to 70
Soldering coppers, lb.	0 53
Lead wool, per lb.	0 16
Putty, 100-lb. drum	4 75
White lead, pure, cwt.	18 00
Red dry lead, 100-lb. kegs, per cwt.	15 45
Glue, English	0 38
Tarred slaters' paper, roll	0 93
Gasoline, per gal., bulk	0 31½
Benzine, per gal., bulk	0 30½
Pure turpentine, single bbls., gal.	0 78
Linseed oil, raw, single, bbls.	1 42
Linseed oil, boiled, single bbls.	1 45
Plaster of Paris, per bbl.	2 50
Sandpaper, B. & A.	list plus 20
Emery Cloth	list plus 33 1-3
Borax, cyrstal	15
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 03
Rosin "G," per lb.	0 03½
Borax crystal and granular	0 15
Wood alcohol, per gallon	2 15
Whiting, plain, per 100 lbs.	2 20

ROPE AND PACKINGS

Plumbers' oakum, per lb.	.09
Packing, square braided	.34
Packing, No. 1 Italian	.40
Packing, No. 2 Italian	.32
Pure Manila rope	.39
British Manila Rope	.33
New Zealand Hemp	.33
Transmission rope, Manila	.45
Drilling cables, Manila	.41
Cotton Rope, ¼-in. and up	.47

POLISHED DRILL ROD.

Discount off list, Montreal and Toronto ..... net

CARBON DRILLS AND REAMERS.

	Per Cent.
S.S. drills, wire sizes up to 52	40
S.S. drills, wire sizes, No. 53 to 80	25
Standard drills to 1½ in.	40
Standard drills, over 1½ in.	15
3-fluted drills, plus	10
Jobbers' and letter sizes	25
Bit stock	25
Ratchet drills	15
S.S. drills for wood	46
Wood boring brace drills	25
Electricians' bits	36
Sockets	40
Sleeves	40
Taper pin reamers	20
Drills and countersinks	list plus 30
Bridge reamers	45
Centre reamers	10
Chucking reamers	10
Hand reamers	15

COLD ROLLED SHAFTING.

At mill	list plus 40%
At warehouse	list plus 50%

Discounts off new list. Warehouse price at Montreal and Toronto.

IRON PIPE FITTINGS.

Canadian malleable, A, add 7½%; B and C, 10%; cast iron, 35%; standard bushings, 25%; headers, 60; flanged unions, 40; malleable bushings, 25 and 7½; nipples, 55; malleable lipped unions, 50.

SHEETS.

	Montreal	Toronto
Sheets, black, No. 28	$11 00	$11 00
Sheets, black, No. 10	12 00	12 00
Canada plates, dull, 52 sheets	12 00	12 00
Canada plates, all bright	12 50	12 50
Apollo brand, 10¾ oz. galvanized	12 25	12 09
Queen's Head, 28 B. W.G	11 75	10 75
Fleur-de-Lis, 28 B.W.G.	11 75	10 75
Gorbal's Best, No. 28	12 00	10 25
Colborne Crown, No. 28	11 25	10 00
Premier, No. 28 U.S.	13 75	11 70
Premier, 10¾ oz.	13 85	12 00
Zinc sheets	20 00	20 00

PROOF COIL CHAIN.

B

¼ in.	$12 00
5-16 in.	11 50
⅜ in.	11 15
7-16 in.	10 90
½ in.	10 70
9-16 in.	10 70
⅝ in.	10 50
¾ in.	10 40
@ in.	10 25
1 inch	10 10
Extra for B.B. Chain	1 20
Extra for B.B.B. Chain	1 80

ELECTRIC WELD COIL CHAIN B B

⅛ in.	$12 00
3/16 in.	
¼ in.	8 40
5/16 in.	7 00
⅜ in.	6 30
7/16 in.	7 00
½ in.	6 30
⅝ in.	6 30
¾ in.	6 30

Prices per 100 lbs.

FILES AND RASPS

	Per Cent
Globe	50
Vulcan	50
P B and Imperial	50
Nicholson	50
Black Diamond	50
J Barton Smith	50
McCleary and Globe	50
Delta Files	50
Disston	50
Whitman & Barnes	45

COAL AND COKE

Solvay Foundry Coke	$
Connelsville Foundry Coke	
Steam Lump Coal	
Best Slack	

Net ton f.o.b. Toronto

BOILER TUBES

	Seamless	Lap welded
1 in.	$	$
1¼ in.	40 00	
1½ in.		36 00
1¾ in.	43 00	36 00
2 in.	50 00	36 00
2¼ in.		45 00
2½ in.	55 00	45 00
3 in.	64 00	50 00
3¼ in.		58 00
3½ in.		60 00
4 in.	90 00	70 00

Prices per 100 feet Montreal and Toronto.

OILS AND COMPOUNDS

Castor oil, per lb.	40
Royalite, per gal., bulk	16
Palmine	19
Machine oil, per gal.	26½
Black oil, per gal.	15
Cylinder oil, Capital	
Cylinder oil, Acme	6½
Separating compound, per lb.	0 06
Lard oil, per gal.	
Extra thread cutting antiseptic	85
Acme cutting oil	
Fish	
Genuine sperm, 50 gal.	
Boiler tube oil	10½

BELTING, NO. 1 OAK TANNED

24/27 heavy, single 6ft.	
Standard	40-5%
Standard	40-5%
Cut leather lacing, No. 1	1 95
Leather in sides	

TAPES

Cotton, Metallic, 50 ft.	$
Cotton, Metallic, 100 ft.	
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 50
Silver Arm Steel Tape, 50 ft.	3 00
Steel Tape, 50 ft.	
Steel Tape, 100 ft.	4 15
Invincible Linen Steel Tape, 50 ft.	3 50

WASTE

White	Cents per lb
No. 1 extra	20
Cottons	20
Blues	19
No. 1	19
No. 1 R	18
Mixed	18
Flannels	18
Light	17
Prints	16

COLORED.

Light	14½
Dark	13
No. 1	13
Peerless	11¼
Red	10½

WOOL PACKING.

Arrow	25
Axle	20
Acme	15
Anchor	11

WASHED WIPERS

Select White	12
Mixed colored	10
Print	09

This list subject to trade discount for quantity.

RUBBER BELTING.

Standard	40%
Best grade	30%

ANODES.

Nickel	30 to 34
Casting	1 to 34
Copper	41 to 47
Zinc	32 to 35
Iron	7 to 15

Prices Per Lb.

COPPER PRODUCTS

	Montreal	Toronto
Bars, 1 to 6 in.	50 00	52 00
Copper wire, list plus 10.		
Plain Sheets, 14x60 to 14x120 base, 14 oz.	53 00	55 50
Copper sheet cuttings, 14x60 14 oz.	50 00	54 25
Cold Rolled Sheet Copper, finished, 14x60 base.	64 00	60 00
Bottoms, 18 inches, 14x base	55 00	57 00

BRASS.

Brass rods, base ½ in to 1 in.	0 35
Brass sheets, 8 in. wide, 20 oz.	0 60
Brass tubing, seamless	0 57
Copper tubing, seamless	0 58

PLATING SUPPLIES.

Polishing wheels, felt.	3 00
Polishing wheels, bull-neck	1 75
Emery in kegs, American	06
Pumice, ground	05
Emery grain	15 to 20
Tripoli composition	04 to 06
Crocus composition	07 to 08
Emery composition	08 to 09

Range of zinc
Range of copper

Prices Per Lb.

LEAD SHEETS

Montreal

Sheets, 1 lb. sq. ft.	
Sheets, 3½ lbs. sq. ft.	8½
Sheets, 4 to 6 lbs. sq. ft.	07 00

Cut sheets, ½c per lb. extra

Cut sheets (3 sides 12 inches or less) extra.

PLATING CHEMICALS

Acid, boracic	$ 35
Acid, sulphuric	08
Acid, hydrofluoric	4½
Acid, nitric	.10
Acid, sulphuric	05
Acid, muriatic	08
Ammonium carbonate	15
Ammonium chloride	.11
Ammonium iron sulphate	40
Ammonium sulphate	05
Arsenic, white	.12
Copper, carbonate, anhy.	.35
Copper, sulphate	17
Cobalt nitrate	70
Iron, potassium cyanide	30
Lead, acetate	16
Nickel ammonium sulphate	12
Nickel carbonate	.35
Nickel sulphate	15
Potassium carbonate	75
Potassium sulphide (sublimed)	20
Silver chloride (per oz.)	.65
Silver nitrate (per oz.)	.65
Sodium bisulphite	.10
Sodium carbonate crystals	05
Sodium cyanide, 127 130%	41
Sodium hydrate	04
Sodium hyposulphite, per 100 lbs.	5 00
Sodium phosphate	14
Tin chloride	60
Zinc chloride	60
Zinc sulphate	05

Prices Per Lb. Unless Otherwise Stated.

The General Market Condition and Tendency

THE situation in the iron and steel industry continues to cause considerable uneasiness in manufacturing circles. No changes have as yet been made in the embargo and until a decision is made in regard to its application the outlook will continue unsettled. Although some relief may be obtained for a number of industries, little, if any, improvement is expected in the situation, as it affects consumers not engaged in the production of war supplies. The shortage of iron and steel, which seems destined to become more acute as time passes, will be a serious matter for some firms and cannot help but restrict manufacturing operations. There is no indication as yet of any downward tendency in prices in the steel market and it is becoming more apparent that there will be few if any recessions for some time. The fact that the mills have still considerable tonnage to deliver tends to keep prices up in spite of the price regulations. Canadian mills are maintaining their prices and have made no intimation of any pending change in schedules. The pig iron market continues quiet and the outlook unsettled, due to the price-fixing policy and shortage of iron. Lower prices on pig iron in Canada are not anticipated just yet as the furnaces are still paying high prices for raw materials; also they have comparatively little iron to sell. The metal markets continue inactive and prices unchanged with the exception of lead which is a shade lower. The shortage of copper seems likely to become more acute owing to drop in production and increasing demand for war purposes. Scrap metals are dull and prices unchanged.

MONTREAL, Que., Oct. 15, 1917.—Activity in industrial circles continues to be of a fair volume but in certain directions, particularly in connection with the manufacture of munitions, the decline has been pronounced. Many plants that have been actively engaged in this work from the start are now closing out on the last of their shell work and in the majority of cases little prospect is offered for renewal contracts. The six inch size is the only one now being produced on a large scale. American developments continue to hold the interest of Canadian manufacturers and at the same time affect the Canadian market to such an extent that business here may receive a setback unless relief is given in securing materials for domestic enterprise. The approaching close of navigation will place additional pressure on railroad operation which is at present taxed exceedingly in taking care of the country's needs.

Pig Iron

The adjustment of pig iron prices at the various United States sources has now become effective in response to the announcement of the government of a fixed price. The approximate decline resulting from recent developments has been about $20 per ton, and the composite price of pig iron at the present time is just above $34 per ton; this being a decline during the week of $10.25 per ton. The present situation is rather complex as consumers are finding it very difficult to place orders at the new prices, and some uncertainty prevails as to what attitude will be taken on orders that were placed when prices were at the high level of the open market. The Canadian situation sees no immediate relief through the changes that have taken place across the line.

Steel

Following the recent announcements by the American Government regarding the fixing of prices and the uncertainty due to developments, the present steel situation remains in a rather unsettled condition. The extent to which further readjustment in steel prices may eventually go, is indicated in the leveling effect that has taken place in the regulations on pig iron, where the prices fixed are practically on the same basis for all furnaces. The entire situation hinges on the requirements of the U.S. Government, as producers are not offering steel or accepting orders at the fixed price until is definitely known the full extent of needs of the Government and Allied requirements. With the exception of war supplies, business is virtually at a standstill. While considerable reductions have of late been made on the open market quotation of billets and sheet bars, it is anticipated that the proposed price for this commodity will be in the neighborhood of $45 per ton, with probably a little higher figure for sheet bars. Activity in plates has been confined to war demand, as owing to the filled up condition of the mills the producers claim they cannot supply the demands of the domestic consumer; since the fixing of prices, no new outside business has been placed and so far the mills have made no sales on the open market at the reduced price fixed by the Government. In some respects the position in plates is even more acute than when the market was controlled by the open demand. A similar condition exists in sheets as the trade is waiting with interest the action of the Government regarding price to be set on this class of steel; such buying as is reported by domestics is only for immediate and urgent requirements. The ever increasing needs of the American Government for their war program tends to maintain the entire market in a very uncertain and unsettled condition. Early developments are further reflected in the market on wire products, which has taken on a very quiet condition in expectation of a lower prevailing price to be fixed by the Government. The Canadian situation is much the same, with the interests of the dealers centered in American developments and the possible effect that such changes will have in the near future. Prices continue very firm owing to the practical embargo that exists on steel coming in from the States.

Metals

The entire market is influenced by the unsettled conditions that are the feature of this and the American situations. The requirements of the United States for the filling of the war program has somewhat disorganized the trade as domestic consumers have been side-tracked during the past few weeks in favor of the Government. To some extent this condition has recently been relieved and in a short time domestic consumers may be assured of a place where their wants will be considered. It has been reported that the full requirements of the Governments for their war needs has been announced and this fact will enable the producers to figure on the requirements of the domestic buyer. Copper supply has increased and is more easily obtainable for domestic use. Tin has become stronger following additional regulations. Spelter and lead are unsettled in view of approaching price fixing. Antimony and aluminum are both dull and easier.

Copper. — Until the requirements of the American Government have been satisfied it is very unlikely that the general situation will be free from the uncertainty that continues to feature the present market. Domestic consumers have been required to wait until the war needs were supplied and even where metal was due on contract it has been impossible to obtain delivery of the same as in every case the Government has commandeered all metal produced for their special use. However, this condition has become easier as the present needs of the war office are known to the producers and consumers are in a better position to cover their requirements. An additional relief has been apparent in the better production that has of late taken place and it is anticipated that conditions will from now on be considerably easier. With no market in the States the fixed price of 23½c prevails. The local market is unchanged, quiet but steady, with prices firm at 31 and 30c per lb.

Tin.—Owing to increased restrictions being placed on shipments from the sources of supply the American market in tin has taken on strength. In an effort to confine the sale of metal as far as possible to essential needs the British Government has issued new regulations on disposal of metal and before shipment will be allowed, it is necessary that specific information be submitted as to the destination of the purchase. The New York quotation has advanced ¼c during the week, the present price being 61c per lb. The local situation is not active but the volume of trade is steady; quotations remain firm at 63c per lb.

Spelter.—Price fixing on spelter will more than likely be announced in the very near future and every indication points to a price closely allied to that prevailing on the market or even lower, as statistics show that production facilities are at present much greater than current requirements; as a matter of fact, operations at some smelters have been discontinued owing to an over supplied market. The New York market is firm but not active and has developed a weaker tendency. The local market is quiet but steady but with an easier tendency; dealers are quoting 10½c per lb.

Lead.—The market is expected to receive a further setback very shortly as a result of the finding of the investigating committee into the lead situation; just what price has been decided on has not been announced but it is anticipated that it will be below that at present prevailing on the open market. For the past several weeks the base price of the market has been 8c although it is believed that sales have been made below this figure. Dealers here are awaiting the American announcement but it is not likely that this market will be immediately affected by Government action. Prices are firm at 11c per lb., but an undertone of weakness is apparent.

Antimony.—Trading is quiet and the market is generally easier, inquiries are light and a weaker tone is developing. New York has declined and dealers here are quoting 18c on a dull market.

Aluminum.—Poor demand has weakened the market and lower prices have been announced; quotations on the New York market have declined one cent per lb., and dealers here report a weaker tone but are maintaining prices at from 63 to 68c per lb.

Machine Tools and Supplies

Nothing of importance has transpired in the machine tool situation and conditions are practically unchanged with business confined to the sale of small requirements of a general character. Business in connection with the munitions industry in Canada is almost nil, owing to the decline in the production of shells. Inquiries for equipment suitable for different classes of marine work have shown some falling off but sufficient is still passing to maintain a favorable degree of activity. Owing to the ever increasing activity that is developing in the States, it has become almost impossible to secure delivery on certain classes of machinery, more particularly of the heavier type, as the bulk of these are needed for American war requirements. The demands in this respect are taxing the capacity of machine tool builders in the States, and the result of this condition should be to stimulate activity through the Canadian industry. The demand for supplies continues to be of a very fair volume but the decrease has been marked in connection with munition requirements; this has however, been somewhat balanced by the increase that has been evident respecting the requirements for ship building purposes. The fixing of prices on raw and semi-finished materials has as yet not affected the price of supplies as the general market continues very firm; it is anticipated however, that the near future will see changes in this direction.

Scrap

The entire scrap situation is affected by the uncertainty surrounding the developments now pending in the States, and the attitude of the American Government in the policy they adopt in the adjusting of prices on old materials; Should action be taken in this connection it is generally believed that the market will assume an easier tone as it is anticipated that any price fixing would be to a lower level. While the scrap iron and steel market in the States has developed a weaker tone, the local situation remains firm and in some instances stronger; old boiler plate has advanced $1 and is quoted at $23 per

ton. Steel rails are bringing $25 while wrought iron rails are quoted as high as $32 per ton. Tinned spikes have been advanced and is now quoted at $15. Steel axles quotations are 3c higher than last week the prevailing price being $32 per ton, certain classes are however [illegible] per ton. In the old metals light copper has remained firm while the heavier grades have developed strength, the [illegible] advance of 1½c per lb. Brass turnings are firm with an average price quotation of 15c per lb. Scrap zinc is easier, a decline of 1½c placing the quotation at 5c per lb. Heavy lead at 7½c shows a decline of 2½c per lb. Tea lead is weaker having declined ½c to 6½c per lb. The market here is nervous and unsettled owing to American developments.

TORONTO, Ont., Oct. 16.—The power question will apparently be a difficult problem to solve this coming winter for in addition to the coal situation there is reported to be a shortage of hydro power in this province. Factories working on war orders will not suffer, but some other hydro power users may have to get along as well as they can. According to reports there is a shortage of approximately 60,000 h.p. and no way of obtaining relief except by utilizing old steam plants put out of commission when hydro power was installed. This will throw an additional strain on the coal situation and supplies are none too heavy. Fuel Controller C. A. Magrath has issued an order limiting coal dealers' profits which may have beneficial results, although there has been an increase in schedule of coal prices in certain mining districts in the States which indicates the possibility of an upward revision of prices already fixed in other districts from which coal for Canada is obtained.

Steel

It is becoming more apparent that the price regulation of steel products in the United States is not going to affect the Canadian markets to any appreciable extent for some time. The U.S. mills have not as yet reduced their prices on export business, except, of course, on Government requirements, and indications are that they will hesitate to accept orders from private consumers at the prices fixed by the Government. The reason advanced by them is that they cannot promise any definite delivery owing to the congested conditions at the mills and heavy demand for steel by the Government. The steel companies are not looking for business as they have still a large amount of steel to deliver before they can consider the new price schedule. Furthermore, the requirements of the U.S. Government and the Allies are becoming increasingly heavy and it will not be long before the tonnage required for war purposes will be such that ordinary consumers will have much difficulty in getting steel at all, regardless of price, for any purpose other than for war business or directly contributary thereto. This situation taken in conjunction with the embargo does not place jobbers or manufacturing consumers in Canada in a very enviable position. While the representations which will be made to the Priority Board at Washington by Canadian manufacturers may result in some relief, it is fairly obvious that the situation will still be acute and manufacturing operations considerably restricted. It is unlikely that firms engaged on war business in Canada will be affected any more than those concerns in the States engaged in similar business, but consumers in both countries working on purely domestic business will be equally handicapped in their manufacturing operations. It is this feature that encourages the belief that prices of iron and steel products will likely remain higher than the regulations call for. There have been no further developments in regard to the embargo and none are expected until the committee of manufacturers have completed their work of collecting data as to the amount and kind of steel required from the States. In the meantime the whole situation is confused and outlook uncertain. Business is quiet as consumers are awaiting developments. Prices continue stationary but firm.

The War Industries Board at Washington has fixed maximum prices on some more steel products in addition to those agreed upon a short time ago. Blooms and billets, 4 by 4 in. and larger are now $47.50 gross ton; billets under 4 by 4 in. are $57; slabs, $50, and sheet bars $57, Pittsburgh and Youngstown bases. The prices will apply to private as well as to Government contracts. The price of billets, fixed at $47.50, represents a reduction from the current market price of about $22.50 a ton; billets at $51, a reduction of from $29 to $44 a ton, and wire rods fixed at $57, a reduction of $33 a ton. Prices later will be fixed on most of the other iron and steel products.

CANADIAN GOVERNMENT PURCHASING COMMISSION

The following gentlemen constitute the Commission appointed to make all purchases under the Dominion $100,000,000 war appropriation:—George F. Galt, Winnipeg; Hormidas Laporte, Montreal; A. E. Kemp, Toronto. Thomas Hilliard is secretary, and the Commission headquarters are at Ottawa.

Pig Iron

The pig iron market continues quiet but unsettled owing to the situation created by the embargo and price regulation. There is very little iron moving as consumers are keeping out of the market pending an adjustment of outstanding difficulties. Practically nothing can be done in Canada to effect any material improvement as Canadian producers, who are principally affected by prevailing conditions, obtain their raw material from across the line. Those concerns which have their own iron ore and coke are in a fortunate position, being independent of outside sources, but, as these firms are using practically their entire pig iron output for their own mills, foundries can not obtain pig iron from them. Indications point to it becoming increasingly difficult to obtain pig iron from the States as there will be very little left for export when the Government and consumers have filled their requirements. There is apparently no cheap coke in sight for some time as it is not believed that there will be a free movement of coke at the Government price until after the beginning of the second half of next year when the greater proportion of contracts will have expired.

Scrap

There is no improvement in the scrap metal situation; the market continues dull with a weak tendency. The hand-to-mouth policy of consumers still obtains and more or less uncertainty controls the business. There is a general shortage of scrap and, were it not for this, prices would doubtless be lower than the prevailing levels. There are no price changes to note this week.

Machine Tools

The trend of business in machine tools appears to be turning right round if the recent development in the market comes to anything. Certain firms in the States appear to be anxious to buy munitions plants in Canada which have not been operated since contracts were completed and there is a ready market for them. Whether the sale of these plants will be allowed or not is open to doubt, but, in view of the fact that the munitions business is now only one-third of what it was formerly, it is not unlikely that permission in some cases will be given. Indications at present are that no more shrapnel contracts will be given out and that 6 in. shells will be the principal size to be made in Canada. Developments may, however, result in a change of present arrangements so it is difficult to say what will actually happen in this regard. A number of firms have contracts for 6 in. shells and the expenditure on munitions will run into about $30,000,000 per month, for the remainder of this year, which is a guarantee of considerable activity in this industry. Some firms are understood to have contracts which will keep them busy for at least three to four months of next year.

Metals

The metal markets are dull and inactive owing to the unsettlement prevailing on account of the price fixing policy in the States. Lead has declined, which is the only price change to note. The outstanding feature is the scarcity of copper due partly to the embargo and also to the shortage which has developed in this metal in the States. The demand for lead and spelter has declined as many consumers of these two metals and copper, not being able to get the latter, are not buying either lead or spelter. Business locally is fairly good, being more of a general character; buying is, however, largely hand-to-mouth.

Copper.—A shortage of copper has de-

veloped in the States due to the decline in production on account of strikes. It is now realized that the U.S. Government will take more copper than was anticipated; there will thus be considerably less metal for private consumers. The local market is firm and prices unchanged. Lake and electrolytics are quoted at 32c and castings at 31c per pound.

Tin.—An advance in London has been reflected in a firmer market here, but prices are unchanged in the meantime. Tin is quoted locally at 63c. per pound.

Spelter.—Statistics on spelter recently issued show a marked increase in smelting capacity in spite of the unsatisfactory market conditions which will tend to keep prices down. The market is easier but unchanged at 10½c per pound.

Lead.—Further weakness has developed in lead in sympathy with the situation in New York. The market is unsettled as it is expected that the price to be fixed by the Government will be lower than the present market. Lead has declined ¼c and is now quoted at 10¾c per pound locally.

Antimony.—The market is weaker but prices are unchanged at 19c per pound.

Aluminum.—Weakness has developed in the market but quotations are unchanged at 62c per pound.

NEW YORK, Oct. 13. — Machinery manufacturers are receiving heavy orders for shop equipment from shipyards, from airplane engine makers and from builders of guns, gun mechanisms and from ammunition manufacturers. At the moment the greatest interest is centered in the requirements of shellmakers and numerous companies, in anticipation of Government awards, are sounding the market for machine tools.

The United States Government is on the point of distributing contracts for large numbers of high explosive projectiles and of smaller shells. One interesting point is that many of the shells will be manufactured to French rather than to American standards. The full program will cover the making of 45,000,000 to 50,000,000 shells for which the United States Government will expend probably between $750,000,000 and $1,000,000,000 for the finished shells. It is estimated that the steel mills will be called upon to deliver 2,000,000 tons of steel bars and forgings to manufacturers of ammunition in the next twelve months and at an average price of 3¾c per pound this steel will call for the payment of $150,000,000.

In the last week, manufacturers of ordnance, gun mechanisms and shells, who have received Government contracts amounting to $100,000,000, have placed orders for several million dollars worth of tools and other large machinery contracts are still pending. The Ordnance Department of the Army has succeeded in including a number of manufacturers at Detroit, Chicago and at other points in the Central West to co-operate closely in the manufacture of gun mechanisms and of shells and shell parts. Manufacturers at Dayton, Ohio, have been installing tools preparatory to beginning work on shell contracts amounting to $20,000,000. Detroit automobile companies are co-operating to fill a $30,000,000 Government contract for gun mechanisms and a Chicago organization, to manufacture special tools for making big guns, is being perfected. At St. Louis manufacturers are preparing to co-operate in the manufacture of gun carriages and gun mounts and in the East several manufacturers are preparing to execute orders for firing mechanisms.

As a result of these activities orders are being placed for over $1,000,000 worth of machine tools and there are other inquiries in the market for tools to be used in equipping shops engaged in work on Government contracts. The Standard Ordnance Co. is buying machinery for a plant at Hamilton, Ohio, in the New York market, and another Ohio manufacturer is buying 145 machine tools at Cleveland. The United States Government is buying 25 turret lathes in the same market, and the Forest City Machine & Forge Co. is building an addition to its Cleveland plant to execute an order for 2,300,000 detonators for 2 and 3-inch shells, while the Cleveland Ordnance Co. is preparing a list of machines required for forging, turning and boring 3-inch and 4-inch guns. Activity continues at the Rock Island Arensal, another contract having been placed for nearly 1,000 tons of steel for 21 store houses, and additional purchases of machine tools have been made in the Chicago territory.

The J. G. White Engineering Corporation has put out a second list covering about 800 machine tools to be installed in airplane engine factories in France for the United States Government. This is a duplication of the purchase made some time since of machine tools to build Liberty motors. Other airplane manufacturers continue in the market for equipment.

Shipyards are still prominently represented in the machinery market. Charles L. Seabury & Co., New York, with a contract to build five mine sweepers for the United States Navy, is buying pneumatic and other tools. The New York Shipbuilding Corporation, who are pushing preparations to build torpedo boat destroyers for the Navy, is issuing a large list of machines and cranes needed. Supplementary orders for machinery are being placed in the New York market by the Union Iron Works of San Francisco. This plant is building a large number of destroyers for the Government.

Steel manufacturers and the War Industries Board have agreed on fixed prices for semi-finished steel, and action will be taken on finished steel prices within a few days.

PITTSBURGH, PA., Oct. 13.—A fresh batch of steel prices was announced at Washington Thursday evening: Billets, 4 x 4 and larger, $47.50; under 4 x 4, $51; slabs, $50; sheet bars, $51; wire rods, $57, all per gross ton; grooved steel skelp, 2.90c; universal mill skelp, 3.15c; sheared skelp, 3.25c; shell steel rounds, 3-inch to and including 5-inch, 3.25c; to 8-inch, 3.50; to 10-inch, 3.75c; over 10-inch, 4.00c. Billets, slabs and sheet bars are f.o.b. Pittsburgh or Youngstown. Wire rods, skelp and shell bars are f.o.b. Pittsburgh. The bar, shape and plate prices of 2.90c, 3.00c and 3.25c announced September 24 were stated to be Pittsburgh or Chicago basis, but the steel manufacturers afterwards stated there had been no mention of a separate Chicago basis and their attitude was that the Pittsburgh basis was to remain as formerly, Chicago prices being Pittsburgh plus freight. As the later announcement names Pittsburgh only, it is fairly safe to assume that the Government has dropped the idea of making Chicago a separate basing point.

The prices announced, as in the former instance, are stated to represent a voluntary agreement between the Government and the manufacturers. As some commercial consumers state they have approached mills and found them unwilling to sell at the new prices and, therefore, question whether all mills are disposed to carry out the agreement, it may be well to state that the writer's interpretation of the spirit of the agreement is that the steel makers will sell freely to the Government for itself, and to the Government's Allies, direct or through the Government, at the stated prices, and that they will not sell to others at higher than the stated prices. This, it would appear, is the obvious interpretation. The mills have a great deal of tonnage on their books, and the Priority Board is to determine the sequence of filling all orders. It would be futile for them to agree to sell to everybody at the stated prices or, for that matter, at any prices at all. All that is practicable is to agree not to sell to other buyers at more than the stated prices.

The announcement of this second batch of prices was the result of a general meeting at Washington Wednesday and Thursday between the War Industries Board and the steel manufacturers, the prices after the meeting having been passed upon by the President. The steel makers had previously been holding meetings among themselves at which they discussed prices, being given some hints it is understood, as to what prices the War Industries Board had in mind. It was expected that prices would be announced for some other products, such as tubular goods, wire products and sheets. The delay is presumably to be attributable to difficulty in reaching a common ground, and further announcements may be expected any day.

Prices in Harmony

Scrutinized in the light of information as to costs of production in different departments, all the prices thus far announced are in close harmony with each other, in better harmony, indeed, than has obtained at any time under ordinary open market conditions, while the price structure of the past few months, created by the competitive bidding of buyers, has been utterly discordant. It would appear that if similar principles obtain as to further price fixing that standard steel pipe will be set on about a 55 per cent.

list, which indeed is the present list of the National Tube Co., most of the independents having either a 49 per cent. or a 42 per cent. list. A 55 per cent. list would apparently be fairly in harmony with the skelp prices announced. The sheet bar prices of $51 would suggest a price for 28 gauge black sheets of about 5.00c, which would call for something like 6.50c for galvanized sheets. The blue annealed sheet question is somewhat intricate, but one method of comparison would set them at 4.00c for 10 gauge, to be in relation to plates at 3.25c, and 28 gauge black sheets at 5.00c. It would seem difficult to avoid setting wire products on the basis of $3.20 for nails, the price the American Steel & Wire Co. has adhered to since early in March, while the independents advanced first to $3.50 and then to $4, while of late they have wavered rather noticeably from the $4 basis.

Markets Continues Dull

The finished steel market had been dull, and increasingly so, for about three months prior to the time when price-fixing actually began, some three weeks ago. There had previously been a sharp decline in buying for far forward deliveries, and then the buying for relatively early deliveries had dwindled. Naturally price fixing would not revive such a market. If there were a call for early deliveries in considerable tonnages it could not be met, as the mills are filled, and as for very late deliveries no one could have an idea when they could be made, with the Priority Board regulating the sequence of filling of all orders. There is no reason to suppose, however, that there would be much buying for early deliveries if the mills were willing to sell freely. Consumers as a rule are covered already and the requirements of many are evidently diminishing. There has been a noteworthy decrease in specifications filed against open contracts, in the past fortnight. However limited may be the offerings in the open market, it has become clear that steel is more plentiful, or it may be said to be less scarce. Buyers have less difficulty in securing deliveries against their contracts.

Exports

As the administration had no legal authority for requiring that sales of steel to all buyers should be at a fixed maximum, and had to depend upon a voluntary agreement to secure the establishment of its "one price for all" doctrine, it naturally had to use all methods that presented themselves for applying pressure. If it be assumed, as seems reasonable, that the embargo on exports was employed in part for this purpose, there is a distinct possibility that the agreement will be followed by a relaxation in the matter of granting export permits, and in the case of Canada in particular. The recent embargo on exports of coal to Canada has been lifted. It had been placed because it was found that advantake was being taken of the priority order, in favor of full shipments in the lake trade, coal being diverted to Canada after it had been routed to Lake Erie ports. Under date of October 10 the Fuel Administration authorized a statement which contained the following reference: "The embargo against sending coal to Canada has been lifted and an arrangement made whereby she is to be supplied on a pro rata basis, substantially as though she were a State of the Union." This year's coal production is estimated to be 10 per cent. in excess of that of last year, and as Canada received 19,000,000 tons last year she is to get 10 per cent. more this year.

Pig Iron

Contrary to expectations, the pig iron schedule has not been announced. It would show the relations between grades, and also between districts, the original fixing being of foundry and basic at $33, valley furnaces. The furnaces assert that they will take care of pressing needs of regular customers, but are not in the open market as they are well sold up.

MARKET LETTER DEVELOPMENT

The attention of metal working plant executives is directed to the enlargement of the scope and usefulness of our Market Letter Department. In New York and Pittsburgh, expert correspondents have been engaged, and are already furnishing each week concise reports of production activities, price movements, etc., within the territory served by each of these important centres. During the next few weeks, further additions will be made to the number of our United States correspondents, embracing other industrial centres, and enlarging thereby the scope of the meantime service being rendered.

MORE STEEL PRICES FIXED

ADVICES from Washington state that an agreement between the War Industries Board and steel manufacturers fixing maximum prices for steel products, about one-third under existing market prices, was approved last Friday by President Wilson. Prices agreed upon, with Pittsburgh and Youngstown as bases, are:

Blooms and billets (4 by 4 in. or larger), $47.50 gross ton; billets (under 4 by 4 in.), $51; slabs, $50; sheet bars, $51.

Prices with Pittsburgh as base are: Steel bars (3 to 5 in.), $3.25 per 100 lbs.; steel bars (5 to 8 in.), $3.50; steel bars (8 to 10 in.), $3.75; steel bars, (over 10 inch), $4; skelp (grooved), $2.90; skelp, (universal), $3.15; (sheared), $3.25.

Prices for pig iron and steel shapes, frames, etc., were fixed by agreement some time ago, and the policy is now extended after frequent conferences between the War Industries Board and the Federal Trade Commission, which supplied cost of production figures, and between the board and the manufacturers. The prices become effective immediately, subject to revision January next.

The board, when announcing the agreement, made this announcement: "The prices will apply to private as well as to Government contracts. The price of billets, fixed at $47.50, represents a reduction from the current market price of about $22.50 a ton; billets at $51, a reduction of $74; sheet bars at $51, a reduction of from $29 to $44 a ton, and wire rods fixed at $57, a reduction of $33 a ton. Prices later will be fixed on most of the other iron and steel products."

IS THERE TOO MUCH STEEL IN SHIPS?

By T. J.

THERE are many people who in these days think that there is too much steel in ships of all kinds, and they may be interested in some remarks which were made by the late Sir William White at a meeting of the Institution of Naval Architects in 1911. He said that in his judgment the margins which were often taken in merchant ship construction were frequently excessive. After allowing fully for the different and difficult conditions under which many classes of merchant ships had to work, he was convinced that in certain classes of vessels a closer approximation might be made with safety to the scantlings and methods of construction which had proved so successful in war ships for long periods, and that much weight might be saved whilst ample strength was provided.

In warship construction they necessarily employed very light scantlings, and the provision of sufficient local strength was often the governing factor in limiting scantlings. Warship builders believed that their proper course was to get from the steel makers beams and bars of sectional forms which would enable them to associate in the best way lightness with strength, and to reduce the work of "building-up" the sections required. The progress of steel manufacture had brought to mercantile shipbuilders the power of getting sections such as were then quite out of the question in the days of iron because of the great cost of special sections. In ships built for the Admiralty service, prices were paid which no private ship-owners would then have looked at. The difficulty had now been surmounted, thanks to the development of steel manufacture, and warships as well as merchant ships had, in that respect, come together more closely than was formerly the case.

But, broadly speaking, he was still of the opinion that, in regard to shell-plating, deck-plating and bulkheads as well as many other portions of structures, there was no real necessity for such marked differences between warships and merchant ships as still existed in practice. Of course, if a mercantile ship has to take the ground frequently, her framing and bottom plating must be

different from those of warships, which are intended to be kept afloat. Merchant ships, also, had to carry large, heavy localized cargoes and this involved special precautions. After allowing for essential differences in conditions of service, however, great benefit might, in his opinion, be derived from a study of the experience gained with warships throughout the world. Designers and builders of merchant ships might safely avail themselves of this experience and that would be true both in regard to considerations of general strength and of local strength.

JAPAN BECOMING BIG STEEL PRODUCER

PROJECTS for two new steel factories in the vicinity of Yokohoma are reported by the Japan *Advertiser*. The Asano Steel Works are projected by Mr. Soichiro Asano, and the other plant is that of the Japan Steel Pipe Factory. Mr. Asano is the president of the Toyo Kisen Kaisha and the founder of the Asano Shipbuilding Co. His shipyards, established only ten months ago, are now operating at full capacity. The Mitsubishi Engine and Iron Works, Nagasaki, and the Kawasaki Dockyard Co., Kobe, also have found it imperative to be able to produce their own steel. Mr. Ryozo Asano, managing director of the Toyo Kisen Kaisha, and son of Mr. Soichiro Asano, has sailed for the United States, where he will investigate the steel industry and make purchases of the latest steel-producing equipment.

Regarding the new Asano Steel Works, Mr. Kato, managing director, and chief engineer of the Asano Shipbuilding Co., is quoted by the *Advertiser* as stating that the independence of the supply of steel has much to do with the independence of the shipbuilding industry of Japan.

The Japan *Chronicle* states that several projects have been launched in that country for establishing iron works. The Tokai Kogyo Kaisha, recently established, has bought an extensive tract of land in a suburb of Wakamatsu, where workshops are being erected.

Another iron-manufacturing company in course of flotation is the Fuji Seiko Kaisha, with a capital of $2,991,000. The Nippon Kotetsu Kaisha also recently invited subscriptions from the public to its capital of $498,500. There is besides, the gigantic project of the Kuhara family of Osaka, with a capital of $4,985,000. The Toyo Seitetsu Kaisha has lately increased its capital to $14,955,000, and has bought an extensive site in Kyushu for new workshops, the building of which will be commenced in April next. When these new factories have been completed the company will be able to produce 170,000 tons of pig iron a year.

Sorel, P.Q.—The Sorel shipyard, one of the oldest shipbuilding plants in Canada, has been acquired by the Federal Government. It has been under lease to the latter for several years.

Enlarged Canadian Trade Intelligence Service

Under the arrangement made by the Minister of Trade and Commerce with Sir Edward Grey in July, 1912, the Department of Trade and Commerce, Ottawa, is able to present the following list of the more important British Consulates whose officers have been instructed by the Foreign Office to answer inquiries from and give information to Canadians who wish to consult them in reference to trade matters.

BRAZIL—Bahia, British Consul. Rio de Janeiro, British Consul General.
CHILE — Valparaiso, British Consul General.
COLOMBIA — Bagota, British Consul General.
ECUADOR—Quito, British Consul General. Guayquil, British Consul.
EGYPT — Alexandria, British Consul General.
FRANCE—Havre, British Consul General. Marseilles, British Consul General.
INDIA—Calcutta, Director General of Commercial Intelligence.
ITALY—Genoa, British Consul General. Milan, British Consul.
MEXICO—Mexico, British Consul General.
NETHERLANDS—Amsterdam, British Consul.
PANAMA—Colon, British Consul. Panama, British Vice-Consul.
PERU—Lima, British Vice-Consul.
PORTUGAL—Lisbon, British Consul.
RUSSIA—Moscow, British Consul General. Petrograd, British Consul, Vladivostock, British Consul. Odessa, British Consul General.
SPAIN—Barcelona, British Consul General. Madrid, British Consul.
SWEDEN—Stockholm, British Consul.
SWITZERLAND—Geneva, British Consul.
URUGUAY—Monte Video, British Vice-Consul.
VENEZUELA — Caracas, British Vice-Consul.

Canadian Commercial Intelligence Service

The Department of Trade and Commerce invites correspondence from Canadian exporters or importers upon all trade matters. Canadian Trade Commissioners and Commercial Agents should be kept supplied with catalogues, price lists, discount rates, etc., and the names and addresses of trade representatives by Canadian exporters. Catalogues should state whether prices are at factory point, f.o.b. at port of shipment, or, which is preferable, c.i.f. at foreign port.

CANADIAN TRADE COMMISSIONERS.

ARGENTINE REPUBLIC—B. S. Webb, Acting Canadian Trade Commissioner, Reconquista, No. 46, Buenos Aires. Cable address, Canadian.
AUSTRALIA—D. H. Ross, Stock Exchange Building, Melbourne. Cable address, Canadian.
BRITISH WEST INDIES—E. H. S. Flood, Bridgetown, Barbadoes, agent also for the Bermudas and British Guiana. Cable address, Canadian.
CHINA—J. W. Ross, 13 Nanking Road, Shanghai. Cable address, Cancoma.
CUBA—Acting Canadian Trade Commissioner, Lonja del Commerci, Apartado 1290, Havana. Cable address, Cantracom.
FRANCE—Phillipe Roy, Commissioner General, 17 and 19 Boulevard des Capucines, Paris. Cable address, Stadacona.
ITALY—W. Mc. Clarke, c/o H. M. Consul, Milan.
JAPAN—E. F. Crowe, Acting Canadian Trade Commissioner, P. O. Box 109, Yokohama. Cable address, Canadian.
HOLLAND—Ph. Geleerd, Acting Canadian Trade Commissioner, Zuidblaak, 26, Rotterdam. Cable address, Watermill.
RUSSIA—C. F. Just, Canadian Government Commercial Agent, Alexandrinskaia, Plosch 9, Petrograd. L. D. Wilgress, Canadian Government Commercial Agent, Bukhgolza Ulitza No. 4, Omsk, Siberia.
NEWFOUNDLAND—W. W. Nicholson, Bank of Montreal Building, Water Street, St. John's. Cable address, Canadian.
NEW ZEALAND—W. A. Beddoe, Union Buildings, Customs Street, Auckland. Cable address, Canadian.
SOUTH AFRICA—W. J. Egan, Norwich Union Buildings, Cape Town. Cable address, Cantracom.
UNITED KINGDOM—Harrison Watson, Sub-division E.C., 2, 73 Basinghall Street, London, E.C., England. Cable address, Sleighing, London. N. D. Johnston, Sun Building, Clare Street, Bristol. Cable address, Canadian. J. E. Ray, Central House, Birmingham. Cable address, Canadian. J. Forsyth Smith, 31 North John Street, Liverpool. Cable address, Cantracom. F. A. C. Bickerdike, 4 St. Ann's Square, Manchester. Cable address, Cantracom. J. Forsyth Smith, Acting Canadian Trade Commissioner, 87 Union Street, Glasgow, Scotland. Cable address, Contracom.

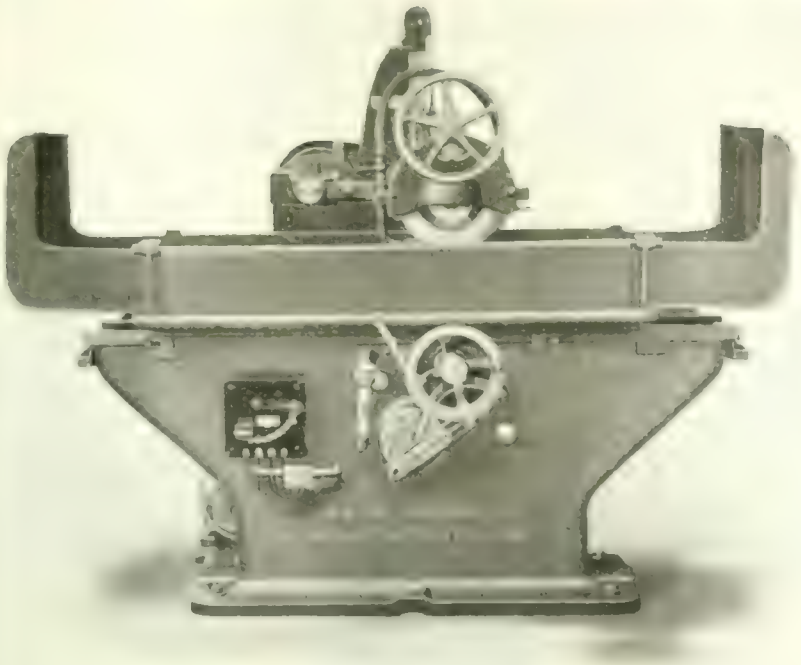
CANADIAN COMMERCIAL AGENTS

AUSTRALIA—B. Millin, Royal Exchange Building, Sydney, N.S.W.
BRITISH WEST INDIES—Edgar Tripp, Port of Spain, Trinidad. Cable address, Canadian. R. H. Curry, Nassau, Bahamas.
NORWAY AND DENMARK—C. E. Sontum Grubbegd No. 4, Christiania, Norway. Cable address, Sontums.
SPAIN—J. F. Roberts, Hotel Cuatro Naciones, Barcelona.

CANADIAN HIGH COMMISSIONER'S OFFICE

UNITED KINGDOM—W. L. Griffith, Secretary, 17 Victoria Street, London, S.W., England. Cable address, Dominion, London.

FOR IMMEDIATE DELIVERY



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No. 1 Automatic Wet Surface Grinder

SPECIFICATIONS

Table Surface . . . . 24 x 12
Takes wheels to . . 12 x 1½
Speed constant . . 1633 RPM
Table speeds . . . 18, 30½, 43
Auto cross feed (variable)
.005" to 3/32"
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Yes— it does look bad

AND if you haven't a Walton Tap Extractor, this broken tap is going to give some trouble before it comes out.

You're going to fuss around, lose your temper, perhaps injure the thread and waste half an hour or more in addition.

But with this Walton Tap Extractor a broken tap presents no difficulties.

The crucible steel fingers go down into the flutes, and the rest is easy. Just apply a wrench to the squared outer end and back the tap out. Can you imagine anything more simple?

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If any advertisement interests you, tear it out now and place with letters to be answered.

INDUSTRIAL AND CONSTRUCTION NEWS

Establishment or Enlargement of Factories, Mills, Power Plants, Etc.; Construction of Railways, Bridges, Etc.; Municipal Undertakings; Mining News

ENGINEERING

Bradford, Ont.—The hydro-electric by-law was carried here by a large majority.

Perth, Ont.—The Henry K. Wampole Co. are building a soap factory here, and are in the market for a steam power plant equipment.

Montreal, Que.—The Montreal Locomotive Co. has been granted a permit to build an addition to its plant on Notre Dame Street East, to cost $23,000.

Port Colborne, Ont.—During a storm here on Friday, the ore bridge at the Canadian Furnace Co's. plant was damaged to the extent of $80,000.

Chambly, Que.—The Canadian Leather Board Co. is in the market for shafting, pulleys and other equipment for its factory which is being erected at a cost of $250,000.

Brockville, Ont.—At a meeting of the Canada Foundries and Forgings Co., held here on Oct. 10, it was decided to purchase the Delaney Iron & Forgings Co's. plant at Buffalo, N.Y. The company will go extensively into the manufacture of marine forgings.

Cochrane, Ont.—The plant of the Metagami Pulp & Paper Co. at Smooth Rock Falls, on the Metagami River, is completed. The turbines have been tested, and the installation considered successful. The plant will be in operation within the next few days.

Victoria, B.C.—The Canadian Copper Co. has sold a $2,500,000 bond issue in New York to finance development of their properties at Copper Mountain and Similkameen. The plans provide for expending the proceeds of the bond issue on the further development of the mine and the construction of a concentrating plant to handle eventually 3,000 tons of ore per day. The company has already spent a million and a quarter dollars on the property. The company has been in negotiations with the Kettle Valley Railway for a branch line to Princeton 13 miles long. Oscar Lachmond is the general manager.

Bridgeburg, Ont. — The shipbuilding plant owned by Canadian Allis-Chalmers Ltd. of Toronto on the Niagara River three miles below Bridgeburg, which has been closed for several years, will be opened at once for the construction of all-steel ships of Welland Canal size. The works were built in 1903 by the now defunct Canadian Shipbuilding Co. Only one boat was built, the E. B. Osler, but that was then the largest steel freighter under Canadian registry on the Great Lakes. It was 553 feet over all. The buildings are modern, and the docks and ways are intact. Some additional shipbuilding machinery will be needed as some of the original machinery was sold by the foundry company which operated the plant for three years in fabricating steel.

Victoria, B.C. — The expenditure of well over one million dollars, spread over eighteen months' work, is involved in the purchase of 350 acres of coal lands at Cassidys Landing in the Nanaimo district of Vancouver Island, establishment of shipping facilities and the erection of a coke and by-products plant at Anyox by the Granby Consolidated Mining, Smelting and Power Co. The coal mined from this property will be shipped north to Anyox to the proposed coke plant, which will be started as soon as possible. It is expected that the manufacture of coke at Anyox will begin within eighteen months. The plant capacity is to be 350 tons of coke per day. The company propose to manufacture sulphate of ammonia, benzol and toluol etc.

U.S. FIRMS PLACE ORDERS IN CANADA

News has just reached us that two Canadian firms have secured contracts for approximately $1,000,000 worth of orders for equipment for ships, from firms in the United States. The delivery of the necessary steel has been guaranteed by the U.S. Government.

GENERAL

Trenton, N.S.—The Humphrey's Glass Works will build a glass factory here to cost $150,000. E. H. Humphrey, of Trenton, is interested.

Campbellford, Ont. — The storage building at the Northumberland Paper and Electric Co.'s plant was destroyed by fire on Oct. 10. The loss is covered by insurance.

Regina, Sask. — The Saskatchewan Co-operative Elevator Co's. elevator at Maryfield was destroyed by fire last Saturday, with an estimated loss of $10,000. Some 6,500 bushels of wheat were also burned. Building and grain were covered by insurance.

MUNICIPAL

Sherbrooke, Que.—The City Council contemplate the installation of a filtration plant.

Stratford, Ont.—A by-law was passed by the City Council on Monday to provide $15.000 for water works extensions.

St. Lambert, Que.—A by-law will be submitted to the ratepayers to sanction an expenditure of $100,000 for street improvements.

Hamilton, Ont.—The City Council have decided to purchase additional steam pumping equipment, at a cost of $159,000. The contract for the pumps was let to the Turbine Equipment Co., and boiler to the Babcock & Wilcox Co.

Montreal, Que.—Following the latest overtures made by the city, the Montreal Abattoirs Co. has written a letter to the Board of Control stating that it is willing to move its packing house and rendering plant outside the city limits upon a yearly payment of $50,000 for twenty years, or $1,000,000 in all.

Regina, Sask.—Preliminary negotiations for the manufacture of the new fuel, oakole, from city garbage and refuse are being conducted between the Canadian Nufuel Co., and the City Commissioners with the object of establishing a plant here for the manufacture of oakole, either as a municipal enterprise or as a private concern with municipal co-operation.

Victoria, B.C.—Seventy-five mayors, aldermen, publicity and development men, from all the chief centres of the province at Duncan recently adopted a constitution of the Good Roads League. A resolution was passed unanimously that the Government be urged to proceed with the construction of a road across the province with the utmost expedition and to endeavor to obtain financial assistance from the Federal Government.

PERSONAL

F. D. Canfield, Junior, a director and large shareholder of the Canada Foundries & Forgings Co., died in New York recently.

Frank Parrish, for many years assistant general purchasing agent of the American Bridge Co., Pittsburgh, and well and favorably known to the trade, has been appointed purchasing agent of the Canadian Steel Corporation, Ltd., effective October 8, and will be located at Ojibway, Ont.

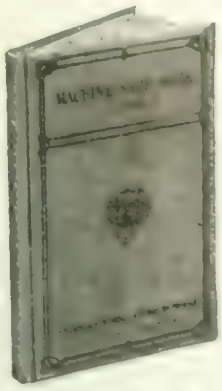
CONTRACTS

Windsor, Ont.—Contracts have been let to the Chick Contracting Co., Windsor, for extension of the Essex Terminal Railway from Ojibway to near Amherstburg, where the Brunner, Mond Co., a subsidiary of the Solvay Process Co., is building an $8,000,000 plant. The contract is worth $60,000.

Fort William, Ont.—In open competition with engineers from New York, Chicago and other American cities the Fort William firm of E. J. McQueen and Co. has secured the contract for the erec-

Mechanical Engineering Books

If you are desirous of improving yourself in your trade and so putting yourself in the position of making more money, these Mechanical Engineering Books will be found helpful.



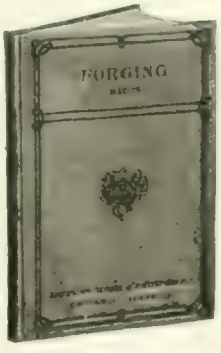
MACHINE-SHOP WORK. By Frederick W. Turner, [illegible] Machine Shop Work, Mechanic Arts High School, Boston. [illegible] pp., 411 illus. Cloth binding. The use of various machine tools is explained, followed by a comprehensive discussion of the planer and lathe [illegible] with the methods of [illegible] and screw cutting. Tapers and eccentric turning are [illegible]. The way to lay out and cut gears for [illegible] planing; boring; [illegible] chucks; milling machines and cutters; [illegible] and cutters; how to cut spirals, gears, cams, [illegible] the operation of [illegible] machines. Price **$1.50**

MECHANICAL DRAWING. By Ervin Kenison, S.B., Assistant Professor of Mechanical Drawing, Massachusetts Institute of Technology. 176 pp., 120 illus. Cloth binding. Gives a course of practical instruction in the art of Mechanical Drawing, based on methods that have stood the test of years of experience. Includes orthographic, isometric and oblique projections, shade lines, intersections and developments, lettering, etc., with abundant exercises and plates. Price...**$1.00**

FOUNDRY WORK. By Wm. C. Stimpson, Head Instructor in Foundry Work and Forging, Department of Science and Technology, Pratt Institute. [illegible] pp., 141 illus. Cloth binding. A practical guide to modern methods of handling and casting in iron, brass, bronze, steel, and other metals, from simple and complex patterns, including many valuable hints on [illegible] equipment, useful tables, etc. Price **$1.00**

PATTERN MAKING. By James Ritchey, Instructor in Wood Working, Armour Institute of Technology. 160 pp., 250 illus. Cloth binding. Shows the reader how to take the blueprint and from it make the pattern for any kind of casting under any condition. The allowances for shrinkage, draft, and finish are explained. Simple and built-up patterns of all kinds are clearly treated. Various special cases are taken up, such as pulleys, cranks, pipe connections, valves, etc. Price **$1.00**

MACHINE DESIGN. By Charles L. Griffin, S.B., Assistant Engineer, the Solvay Process Co., American Society of Mechanical Engineers. [illegible] pp., [illegible] designs. Cloth binding. Explains in detail how to make the entire design of all kinds of machinery, how to lay out gears, etc., with complete specifications [illegible] of machines. Price **$1.50**



FORGING. By John Lord Bacon, Eng. and Supt. of Construction, with R. P. Shields & Son, San Diego, Cal., American Society Mechanical Engineers. Author of "Forge Practice." 128 pp., 180 illus. Cloth binding. A working handbook of practical instruction in hammering, working, forming, and tempering of wrought iron, machine steel, and tool steel, including the important modern development of electric welding. Price ... **$1.00**

TOOL MAKING. By Edward R. Markham, Consulting Mechanical Engineer, formerly Superintendent of the Waltham Watch Tool Co., American Society of Mechanical Engineers, Author of "The American Steel Worker." 224 pp., 325 illus. Cloth binding. Takes up the methods of treating tool steels — annealing, tempering, spring tempering, hardening, case-hardening, etc.; how to make drills and reamers of all kinds; the making of arbors and mandrels, taps, hobs, reamer and tap-holders, jigs, gauges, dies and die-holders of all kinds, counterbores, facing tools, milling cutters, hollow mills, and forming tools. Gives all necessary information for tool making in all its branches. Price ...**$1.50**

Sent postpaid on receipt of price. We can also furnish you with other standard works on Engineering in all its branches, including books for Civil Engineers, Contractors, Electricians, Foundrymen, Steam Engineers, Mechanical Engineers, Municipal Engineers, Railroad Engineers, Sanitary Engineers, Gas Engineers, Hydraulic Engineers, Technical Men.

Technical Book Department

MacLean Publishing Company **143 University Ave., Toronto**

tion of a reinforced concrete elevator for Henry Ford and Son, of Detroit, Mich., to be erected on the Ford country estate at Dearborn, Mich., and is to be completed before Jan. 1, 1918.

TRADE GOSSIP

Red Cross Donation.—The Vanadium-Alloys Steel Co., Pittsburgh, Pa., have forwarded through Canadian Machinery a cheque for $300 towards the British Red Cross fund, the city of Toronto week's campaign for which opened on Monday, October 15.

High Cost of Glycerine.—Glycerine a few days ago reached highest price it has ever touched, selling at 70 cents a pound in the United States. Highest before the war was 24½ cents a pound. Within the last few weeks the price has been rising rapidly because of the demand from explosives manufacturers.

Victoria, B.C.—The persistent rumors that it was the intention of the Imperial Munitions Board in Canada not to renew British Columbia contracts for munitions of war are apparently true, since already some 800 workers, male and female, engaged in their manufacture, have been laid off in Victoria, Vancouver and New Westminster.

Carry No Matches Into Explosive Plants.—An order in council has been passed at Ottawa providing heavy penalties for any person who attempts to take matches, or has matches in his possession, in any explosive factory. Anyone guilty of infraction is liable to a fine not exceeding $100, or six months imprisonment, or both.

Blow to Hydro-Electric.—"If the Dominion Government gives the Aluminum Co. the right to dam the St. Lawrence, it will be a calamity and a blow to the Hydro-Electric power development in the province," Sir Adam Beck declared at Toronto recently in referring to the report that the Aluminum Co. has been given permission to build a dam at the Long Sault in the St. Lawrence river.

Research Work in Great Britain.—J. E. Ray, Dominion Trade Commissioner in Great Britain, reports that important work is being done by the British Advisory Council for Scientific and Industrial Research. He states that progress has been made in the production of a marketable hard porcelain from purely British material, also in discoveries in respect to high-speed steel, which have proved of great value to the Admiralty.

Marine Insurance Drops.—A Washington, D.C. despatch states that a cut of 22 per cent. in the cost of Government insurance for crews traversing the submarine zone was taken as further evidence of waning U-boat effectiveness. Vessels trading with the Azores, the Canary Islands and Morocco ports on the Atlantic were added by to-day's treasury order to those touching at European and Mediterranean ports as requiring seamen's insurance.

The Turbine Equipment Co., Toronto, have been awarded the contract for the new pumping plant for the City of Hamilton. The new equipment will be installed at the Beach pumping station and will consist of the following: One ten million Imperial gallon capacity De Laval centrifugal pump driven by a 815 h.p. De Laval steam turbine. One pump of the same make, type and capacity driven by a 900 h.p. Canadian Westinghouse motor, and a 400 h.p. Babcock and Wilcox water tube boiler.

To Aid Montreal Manufacturers.—Facilities to enable Montreal manufacturers to obtain more promptly information on transportation tariffs are being provided by the Montreal branch of the Canadian Manufacturers' Association. W. P. Hughes, the local secretary, spent some time in Toronto recently with J. E. Walsh, the association's transportation manager, and his assistant, S. B. Brown, revising the tariff files. Now a list of about 500 tariffs is available at the Montreal office for consultation by members.

Noel J. Ogilvie succeeds the late Dr. W. F. King, C.M.G., as superintendent of the Geodetic Survey of Canada. Mr. Ogilvie received his commission as a surveyor in February, 1905. In 1905-06 he was in charge of a survey party on the International boundry survey of the 49th parallel of latitude, covering all branches of this work. In 1914 Mr. Ogilvie was given the title of assistant superintendent of the Geodetic Survey. Recently he was in charge of the geodetic survey of the British Columbia coast.

U. S. Steel Corporation's Unfilled Tonnage.—The unfilled tonnage on the books of the U. S. Steel Corporation of September 30 last was 9.833,477 tons, a decrease of 573,572 tons from August 31, according to the monthly statement of the corporation issued recently. This is the fifth successive monthly decrease in the figures since the high record of 12,183,083 tons was established last April. The unfilled tonnage to-day compared with 10,407.049 Aug. 31. and 10 844.164 July 31. On Sept. 30, 1916, unfilled tonnage totalled 9 552.584.

U.S. Fuel Oil for Great Britain.—An ample supply of fuel oil for the British navy was assured at a conference between British Government representatives, Standard Oil officials and members of the U.S. Shipping Board at Washington on Oct. 10. The Shipping Board will rush construction of 58 oil tankers recently commandeered in shipbuilding yards, and is considering building at least forty more. The problem, it was declared, is entirely one of tonnage, as there is an abundance of oil on this side of the Atlantic.

Terminal Transportation Association Formed.—Departmental heads of the transportation companies in Toronto have formed an association for improvement of business conditions which is to be known as the Toronto Terminal Transportation Association. The intention is for the present that the association will confer with shippers and shippers' representatives to bring about bettered conditions on the railways first and then with the public. W. H. Farrell, Superintendent G. T. R., Toronto, is Chairman of the association.

G. T. R. Directors Return East.—A. W. Smithers, chairman of the Grand Trunk Railway System, accompanied by a number of officials, has returned to Montreal, after a twelve thousand-mile inspection of the G. T. R. System. In addition to Mr. Smithers, the party included Howard G. Kelley, newly-appointed president of the system; J. E. Dalrymple, vice-president, in charge of traffic; Frank Scott, vice-president and treasurer; C. G. Jones, assistant to the president; R. Molson Macpherson, of Quebec, director of the G. T. P., and Jules Horne, of Montreal, director of the G. T. P.

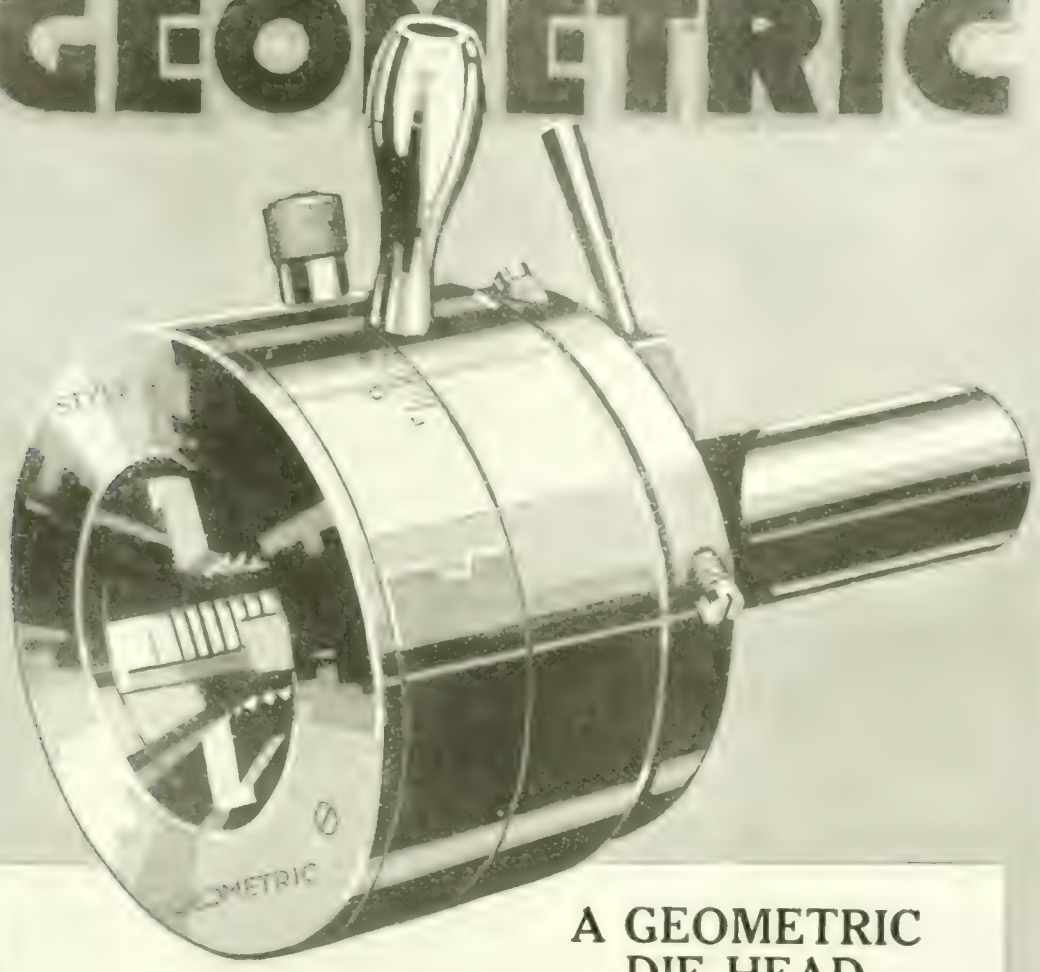
To Fix Dealers' Profits on Coal.—Regulations are being framed by C. A. Magrath, fuel controller, for the fixing of profits on the sale of coal by brokers, wholesalers and retailers, throughout Canada. It is understood that retail profits will be limited to 50c a ton and wholesale dealers' and brokers' profits will be on a still lower scale. It is also likely that provision will be made to restrict undue accumulation of coal in the hands of consumers. The fuel controller in his new regulations is following closely the precedent established in fixing the price of coal in Great Britain, which deals with restrictions of profits of middlemen rather than cost of production.

Railway Stock Ready for France.—American manufacturing enterprise again has demonstrated its ability to meet the extraordinary demands of war. It was disclosed recently that within twenty days after the War Department delivered designs for special locomotives and cars for the troops in France, the first of 680 engines and the first of 6,000 cars were ready for shipment. French railroads will not stand the weight and length of standard American rolling stock. The special engines weigh 166,500 pounds and the new cars are only 36 feet in length, to negotiate the short curves of French roads.

Montreal Firm Builds Wooden Ships.—Keels have been laid by the Fraser Brace Co. of Montreal for the erection of two wooden ships in their shipyard on the south bank of the Lachine Canal, between the Atwater and Cote St. Paul bridges. And just as soon as these have been well advanced, keels will be laid for two more. The ships will be built of wood and each will have a carrying capacity of 2,500 tons. The Fraser Brace Co. will build the hulls only, and each of these will cost about $250,000. This $1,000,000 contract has been awarded the Fraser Brace Company by the Imperial Munitions Board. The company has taken out permits to put up four small buildings at the shipyard that will mean an expenditure of about $8,000. A sawmill is included in the list.

Coal Embargo to Canada Lifted.—The embargo on coal shipments to Canada was lifted last Wednesday by the fuel administration at Washington which decided that shipments can go forward through lake ports without endangering

GEOMETRIC



A GEOMETRIC DIE HEAD

THE MONARCH OF THE SCREW-CUTTING INDUSTRY

For nearly a quarter of a century Geometric Die Heads have been steadily increasing production for the user and increasing business for themselves. Every Geometric Die Head sells another.

Inquire of the established users of Screw Machines and Turret Lathes, and get their opinion of the Geometric Die Heads.

Whatever your threading problem, there is a Geometric Die Head to solve it—in the most economical way.

Why should you not take advantage of the Geometric method of Screw Cutting? Whenever you are ready to take up your threading proposition with us, you will find us ready to advise with you.

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NEW HAVEN **CONNECTICUT**

Canadian Agents: Williams & Wilson, Ltd., Montreal; The A. R. Williams Machinery Co., Ltd., Toronto, Winnipeg, and St. John, N.B.

the supply of the north-western states. "This action was taken," it was announced, "because it is vital that Canada's war industries be kept going at full blast. Canada got approximately 19,000,000 tons of coal, anthracite and bituminous, from the United States last year. This year she will receive the same amount, plus an increase prorated upon the excess over last year's production.

Ships of Concrete.—There is under construction at the Bureau of Standards in Washington a nine-foot model of an ocean-going ship made of concrete. It is being made at the request of the United States Emergency Fleet Corporation to test the virtue of claims of engineers that a seaworthy ship may be built of concrete; that it can be constructed more cheaply, and that it will weigh less than a wooden ship of the same tonnage. The Fleet Corporation also has its eyes on a 5,000 ton vessel that is being constructed of concrete in San Francisco. This vessel, ordered by the Standard Oil Co., has been taken over by the Government, and will be tested in actual operation as soon as it is finished.

U.S. Firm to Build Concrete Boats.—Ships of concrete are to be built near Detroit by the Torcrete Shipbuilding Co., recently organized in Chicago. The company is now negotiating for a suitable site on which to begin building 1,-200-ton reinforced concrete vessels after what is known as the Torcrete system. Steamers are to be built here for the Great Lakes service. Additional yards will be established later, it is said, in New York, New Orleans and Los Angeles. Torcrete is a combination of steel and concrete. The practical application of which is described as creating a laminated hull inside steel reinforcing. It is applied under air pressure, following a new process.

Asbestos Production.—The production of asbestos in Canada during 1916 and the first half of 1917, according to returns received by the Mines Branch, Department of Mines, Ottawa, is shown: Total sales and shipments amounted to 73,203 tons for the first six months of 1917, valued at $3,091,575, while the whole number of shipments for 1916 were 154,149 tons, with a value of $5,-228,869. The value of asbestos exported in 1916 was $4,133,735, while for the asbestos exported during the first half of the current year $2,465,957 was received. Imports in the way of manufactured asbestos during 1916 amounted to $334,670, while the imports for the first six months of 1917 have amounted to $287,056.

Robert Weir, president and director of J. & R. Weir, Ltd., Montreal, marine engineers, boilermakers and machinists, died Oct. 8, at the Western Hospital, Montreal, where he had been ill for the past three weeks. He was in his 72nd year, and had been a resident of Montreal for forty-six years. Mr. Weir was born in Glasgow, Scotland, in 1846, and came to Montreal in 1871, following his brother, the late James Campbell Weir, who had come here in 1860, and established the marine engineering and machinist business. He joined his brother in the business, and in 1875 they formed the partnership of J. & R. Weir, which later expanded and became J. & R. Weir, Ltd. When J. C. Weir died, about six years ago, Robert Weir succeeded him as president and director of the company.

Sulphuric Acid Production Increase.—Increase in the production of sulphuric acid to the extent of 2,000,000 tons a year by means of greater activity in the mining of domestic pyrites was set forth as a war service of the American Institute of Mining Engineers at session of the International Congress held at St. Louis, Mo., last week. Sulphuric acid is a requisite in the manufacture of ammunition, and also is an important ingredient in fertilizer. More than 6,000,-000 tons of sulphuric acid were produced in the United States last year, and the war makes it necessary to increase this production to 8,000,000 tons. The principal American pyrites mines are in Virginia, New York and California. Last year almost half of the sulphuric acid produced in the States was made from Spanish pyrites.

U. S. Coal Movement Light.—A Cleveland, O., despatch states that the movement of bituminous coal from Lake Erie ports dropped below a million tons last week for the first time in six weeks. The fleet loaded 967,430 tons, and it is claimed the million-ton mark would have been reached only for cutting off shipments to Canadian ports. There is some coal that is consigned to Canada that American dealers will not take, and there are a number of cargoes of that class waiting at Lake Erie ports. In September the fleet loaded 4,609,366 tons of soft coal and Canadian ports received about a third of the total movement. Shipments to American ports for the month were 3,413,932 tons, and vessels took 1,195,434 tons to Canadian ports. The Lake Superior ports received about 3,000,000 tons, and shipments to Lake Michigan ports were 926,063 tons.

Shortage of Hydro Power in Ontario.—Sir Adam Beck of the Hydro Commission announced recently that there was a serious shortage of power, particularly between Toronto and Niagara. It was stated that about 60,000 h.p. was badly needed and the engineers have been gathering data in order to determine what industries can be restricted in the use of power between the hours of 5 p.m. and 8 p.m. This information will further show the number of plants which supplied power for the operation of railways previous to the advent of hydro and then it can readily be seen the amount that can be diverted to the munition plants which are in need of power. It is understood new contracts are being discouraged and municipalities being warned to look out for themselves when their present contract terminates and as their places cease to be hydro customers the amount of power they consume will be turned over to plants working on war materials.

Large Ventilating Contract.—Sheldons Ltd. of Galt, Ont., have secured the largest contract for ventilating equipment ever awarded in Canada. The equipment is for the New Union Station now approaching completion at Toronto, and will consist of 26 Keith multivane fans driven by Canadian Westinghouse motors. Twelve of these will be supply fans delivering a total volume of 270,-000 cu. ft. of air per minute and fourteen will be exhaust fans having a total capacity of 210,000 cu. ft. per minute. The contract includes air washing, cooling and humidifying equipment consisting of eleven air washers of the Sheldon Spray type and 17,400 sq. feet of vento radiating surface used in the form of tempering and reheating coils. The contract price was $63,000. Wells & Newton of New York and Toronto are the contractors for the plumbing, heating and ventilating. Walter A. Armstrong is the consulting engineer and Ross & MacDonald are the architects.

Canadian Steel Corporation Developments.—Further particulars have been received respecting the Great Lakes Dredging Co.'s contract at the Canadian Steel Corporation plant at Ojibway, Ont. The marine slip or harbor and wharves will provide for the unloading and storage of ore, limestone and fuel. The harbor will extend about 2,403 feet inland from the harbor line along the left bank of the Detroit River. Its width, from face to face of the concrete walls, which will be 9 feet high by 12 feet wide, will be 400 feet. This reduces to 202 feet between walls at a distance of 303 feet from the harbor line. It continues at the width of 202 feet for a further distance of 2,100 feet inland from this point. The depth will be 23 feet measured from the mean water level of the Detroit River. All piles supporting concrete walls will be approximately 80 feet in length and will be driven to rock. Ore and limestone will be unloaded and stored on one side of this slip and coal for by-product coke ovens and general plant use on the other side. The work does not include piling or concrete walls for support of bridges; neither does it include any unloading machinery.

BUILDING

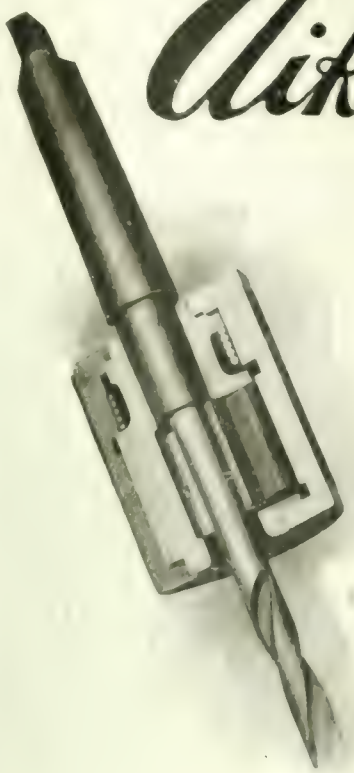
Toronto, Ont.—A building permit has been issued to the Toronto Hosiery Co. for a factory addition at 1103 Queen St. West, to cost $1,600.

TENDERS

Toronto, Ont.—Tenders, addressed to the Board of Control, will be received up to Tuesday, October 30th, 1917, for supplying 5,000 feet 2½-inch fire hose. Forms of tender and all information may be obtained upon application at the office of the Fire Department, No. 152 Adelaide Street West, Toronto.

INCORPORATIONS

Canadian Union Iron Mines Corporation has been incorporated at Ottawa by A. Savard, T. F. Lyons and N. Terk, all of Montreal, with a capital of $1,000,000.



Aikenhead's New Chuck

Will stop you losing your drilling profits

Minutes mean profit—are you losing minutes? There is no loss of time in tool changes when you use a

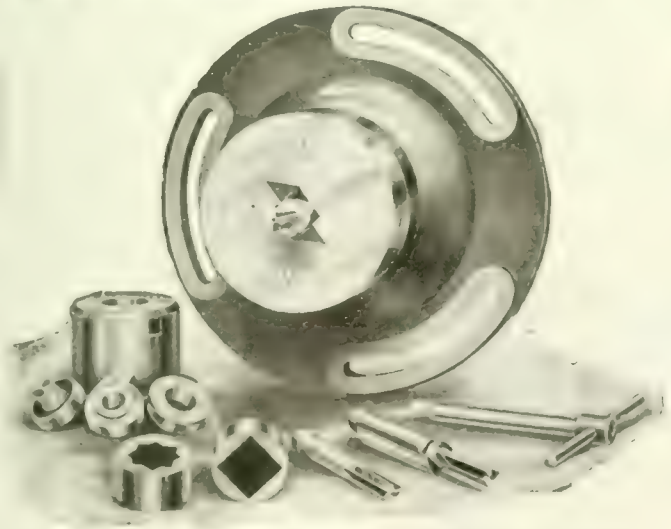
WAHLSTROM CHUCK

It is entirely automatic in its action—tool changes may be made without stopping the spindle—just grasp the shell of the chuck with one hand and make the tool change with the other. The change is made in a tenth of the time required with the ordinary chuck—and the tool automatically centers itself.

The Wahlstrom comes in two types—one for straight-shank tools, the other for Nos. 1, 2 and 3 M T shank tools—they are both "Production Increasers," which demands your attention. Write for information now.

AIKENHEAD HARDWARE LIMITED
17, 19, 21 Temperance Street - Toronto, Canada

Aikenhead's RADBORE HEAD



MAXIMUM ACCURACY—MINIMUM COST

Drills Square Holes Accurate

Radbore Heads will drill square holes through the material or they will drill square holes to any desired depth with perfectly flat bottoms! Once in your shop the uses that spring up for this head will be remarkable.

Aikenhead Hardware Limited
17, 19, 21 Temperance Street, Toronto

to acquire and develop mining properties. The head office is at Montreal.

The Ontario-Quebec Pulpwood Co. has been incorporated at Toronto with a capital of $40,000, to manufacture pulp and pulp products at Cochrane, Ont. The provisional directors are Charles M. Garvey, T. M. Weatherhead and B. E. Lawless, all of Toronto.

The Dominion Battery Co. has been incorporated at Ottawa with a capital of $200,000 to manufacture batteries of all kinds, flashlights, lamps, heating appliances, etc., at Montreal. The incorporators are: Eldon Moir, John Campbell, and Oral N. Birchard, all of Montreal.

The Canada Scale & Slicer Co. has been incorporated at Ottawa with a capital stock of $150,000 to manufacture weighing machines, scales, slicers, etc., at Toronto. The incorporators are: Charles E. Strowger, Edward P. Park, and Arthur E. Watts, all of Toronto.

The Bethune Pulp & Lumber Co. has been incorporated at Toronto with a capital stock of $50,000 to carry on business as saw millers, pulp and paper millers, etc. The head office is at Toronto, and the provisional directors are: J. L. Ross, A. W. Holmstead, and L. B. Campbell, all of Toronto.

WOODWORKING

Pembroke, Ont.—Representatives of the Waterous Engine Co., of Brantford, have been in Pembroke lately, preparing plans for the enlargement of the Petawawa Lumber Co.'s mill, which will be used temporarily by the Colonial Lumber Co., or until such time as conditions are favorable for the erection of a large new mill by that company.

RAILWAYS—BRIDGES

Bathurst, N.B.—A largely signed petition of Gloucester county residents has been forwarded to Ottawa asking the Government to take over the Caraquet and Gulf Shore Railroad and operate it as part of the Canadian Government system. It is set forth that the road is in poor condition physically, a fact admitted by the management and that operations are likely to cease entirely.

CATALOGUES

Chromel. Folder issued by the Canadian Hoskins, Ltd., Walkerville, Ont., describing the material chromel an alloy of nickel and chromium, and detailing the purposes for which it is used. Reference is also made to the company's tool laboratory and melting furnaces.

Screw Cutting Lathe.—Bulletin describing the Hercules 12 inch screw cutting engine lathe built by the Himoff Machine Co., New York. The bulletin contains a detailed description of the lathe with illustrations and a specifications giving the general dimensions, weights, etc.

Pneumatic Tools.—Circular 2 just off the press is being distributed by the Independent Pneumatic Tool Co., Chicago, Ill. The circular illustrates and describes an interesting line of "Thor" pneumatic tools and electric drills. Specifications are also included giving the principal dimensions, capacity etc., of the various sizes.

Stellite.—Bulletin describing the properties and principal features of Stellite, an alloy for high-speed cutting tools. The bulletin contains particulars of some cutting performances of this material and how it is used. The concluding pages contain particulars of other lines handled by the Canadian B. K. Morton Co., Toronto, and Montreal, from whom copies of the bulletin can be obtained.

The Taylor Instrument Companies, Rochester, N.Y,. have just issued a new catalogue on temperature regulators, which is especially valuable to the engineer and the buyer, because it shows many illustrations of varied applications. In fact, the company has made a sincere effort to put into the catalogue those things which are too often left out of the average book, namely, "pictures." It is the most complete catalogue covering one specific type of temperature regulator which the Taylor Instrument Companies has published. Section 17,000 will be sent to anyone who will write to the above company and give his name, address and business connections.

BOOK REVIEW

The Commissioner of Conservation has published a report of the eighth annual meeting held at Ottawa in January. The report contains twenty-four chapters covering matters of vital interest to Canadians presented in a comprehensive manner together with figures and statistics which materially increase the value of the subject matter. The following include some of the principal subjects covered in the report: The social evil in Canada. An address on The Production and Preservation of Food Supplies, by Dr. P. H. Bryce, gives tables showing the relative values of different foods. Results of experiments by the Commission of Port Dover, Ont., in utilizing fish waste in the manufacture of stock meal, oils and fertilizers, are set forth, whilst Drs. H. J. Wheeler and Frank T. Shutt make interesting contributions on the use of commercial fertilizers. In addition, a readable account is given of the varied activities of the Commission including town-planning, game preservation, waterpowers, agriculture, mining and general publicity work.

TRADE IN NEW ZEALAND

THE following information respecting trade in machinery in New Zealand in 1916 is taken from a report recently issued on the trade of the Dominion by R. W. Dalton, H. M. Trade Commissioner in New Zealand. In those trades in this class in which the position of British firms is unsatisfactory, the reason is to be found chiefly in one or more of the following facts: (1) That British manufacturers have not examined the development of the Dominion; (2) that if they knew of the development they have either not realized its importance or have not attempted to cater for it, but have persisted in offering unsuitable lines; and (3) that their selling campaigns are not adequate. Mr. Dalton says he can quite understand that firms may not find it profitable to manufacture certain lines exclusively for the New Zealand market, if those lines are different from their standard designs. If this is so, however, it would, in his opinion, be better for themselves and for the reputation of British trade in general to refrain from offering lines which are unsuitable, or from offering suitable goods in such a manner as would seem to indicate that it was immaterial to them whether they got the trade or not. As it is, British manufacturers are continually being compared with American manufacturers to the disadvantage of the former. The fact is, of course, that the American manufacturers supply machinery which is similar to that made for their own home conditions, and it is, therefore, not particularly enterprising of them thus to supply New Zealand's needs.

TRADE INQUIRIES

THE following trade inquiries have been received by the Department of Trade and Commerce, Ottawa, from which further particulars may be obtained:

1353. **Pyrites.**—A fertilizer company in the United States requires regular shipments of Canadian pyrites. Would purchase ten carloads weekly and would be glad to pay cash when loaded on cars if necessary.

1367. **Metallic.**—A Genoese house interested in cobalt and stellite high-grade steel, and importers of same, is prepared to buy metallic cobalt and stellite.

1369. **Castings and Rolled Steel.**— An engineer in Milan, with references in Great Britain and the United States, desires to hear from Canadian manufacturers interested in steel castings for railways and tramways cars, drums and discs for steam turbines, shafts for steamers and railway and tramway points and crossings.

U. S. PRIORITY PLAN FOR STEEL

ADDITIONAL details of the United States priority plan in regard to iron and steel have been received by the Department of Trade and Commerce, Ottawa. The announcement received by the department is signed by Judge Robert S. Lovett, chairman of the United States Priorities Committee of the War Industries Board of the Council of National Defence, and is approved by the Secretaries of War any the Navy.

Under regulations of the committee, the announcement states all orders and work are divided into three classes:

Class A comprises war work—that is to say, orders and work urgently necessary in carrying on the war, such as arms, ammunition, ships, etc., and the materials required in their manufacture.

Class B comprises orders and work which, while not primarily designed for the prosecution of the war, yet are of public interest and essential to the national welfare, or otherwise of exceptional importance.

Class C comprises all orders not em-

braced in class A or class B. The first two classes are again divided into four sub-divisions.

Difficulties encountered by Canadian importers and users of steel since the adoption of the United States system of licensing iron and steel exports is under review by a committee, which is expected to report within a week or so.

BUYING MORE FROM THE UNITED STATES

CANADA is now buying from the United States at the rate of $26,500,000 a month more than last year.

The detailed figures of the foreign trade of the United States for the fiscal year ending June 30 show an increase of $319,000,000 in the total of Canada's purchases in that country as compared with 1915-16.

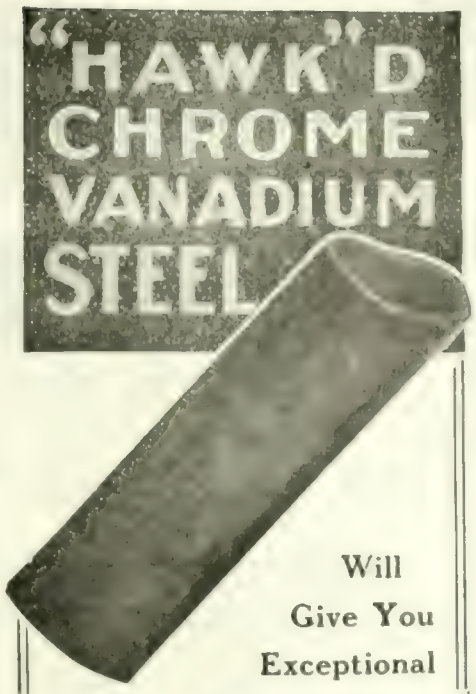
Washington's details of American trade for the twelve months ending June 30 show Canada as the third largest purchaser of goods in the United States, and offer substantial reasons why Canada's occasional applications for credit arrangement merit favorable consideration.. Great Britain again led, with a total of upwards of two billions, and France was second with upwards of a billion. But at upwards of three-quarters of a billion dollars, Canada's total was $360,000,000 ahead of the country fourth in the list—namely, Russia-in-Europe.

Comparisons of American exports to the four leading customers of the United States for the last two fiscal years ending June 30 show:

	1917.	1916.
Britain ..	$2,047,545,843	$1,526,685,102
France ..	1,011,529,095	628,851,988
Canada ..	787,529,729	468,784,793
Russia ..	428,284,663	178,694,800

U. S. PIG IRON PRODUCTION SHRINKAGE

RAILROAD embargoes, a shortage of fuel at steel plants and at blast furnaces resulting from a diversion of railroad cars to the Northwest, and causing the banking of many furnaces, together with the rebellious labor at various works, conspired in September to reduce the output of pig iron and of rolled and cast steel in the U.S. by three to five per cent., as compared with the preceding month. It is estimated that the United States Steel Corporation operated less than 90 per cent. of capacity in September. There were also only 24 working days in the month, indicating that the total production of steel ingots was a little over 1,500,000tons, which means the production of 1,134,000 tons of rolled products. There was thus a decrease of over 200,000 tons in the production of crude steel and a loss of 180,000 tons of rolled products, as compared with August. Shipments, for the same reasons that cut down production, were estimated to have been 150,000 tons less than in August, pointing to total September shipments of 1,100,000 tons. If the subsidiary companies booked as large orders in September as in August, it would indicate a decrease of 300,000 tons in unfilled orders.



Will Give You Exceptional

Shell Forging Production

WITHOUT AN EQUAL FOR BOTH FIRST AND SECOND OPERATION PUNCHES.

Comes to you heat-treated and ready for use.

It does not stick to the work.

There are many cases where each punch has turned out over 2,000 shells.

It means more shells, per machine per day.

STEEL OF EVERY DESCRIPTION.

Hawkridge Brothers Company

303 Congress St., BOSTON, MASS. U. S. A.

The Original Solid Woven Cotton Belt

IT CAN BE USED on all Direct Drives, whether straight or crossed.

On Shifters
On Hot Places
On Oily Places
On Dusty Places

WRITE FOR OUR FREE BELTING BOOK.

It will help you end your belting troubles.

Federal Engineering Company Limited

172 John St., Toronto

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RESEARCH BUREAU

REPORTS BY EXPERTS ON SCIENTIFIC, TECHNICAL AND INDUSTRIAL DEVELOPMENT.

SPECIAL RESEARCHES ARRANGED.

PATENTS, TRADE MARKS, ETC.

HANBURY A. BUDDEN — CANADA, BRITISH AND FOREIGN PATENTS

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THE IRON WORKS LIMITED

Successors to

Owen Sound Iron Works

Owen Sound, Ont.

Engineers
Boiler-makers
Founders
Machinists

Tank Work
Smoke Stacks,
Grey Iron and
Brass Castings,
Special
Machinery
Made to
Order

PATENTS

Fetherstonhaugh & Co.

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In all countries. Ask for our Investor's Adviser, which will be sent free.

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Merchants Bank Building, corner St. Catherine St., MONTREAL, Phone Up. 6474 and Washington, D.C., U.S.A.

CLASSIFIED ADVERTISING SECTION

Rates (payable in advance): Two cents per word first insertion; one cent per word subsequent insertions. Count five words when box number is required. Each figure counts as one word. Minimum order $1.00. Display rates on application.

FOR SALE

SIX COMPRESSORS FOR SALE VERY cheap. The National Quarry, 81 St. Peter St., Quebec. c18m

BOILER FOR SALE—ONE HEINE SAFETY horizontal, single drum, water tube boiler, 120 H.P., 36" diam., 19 ft. long, 5-16" shell steam drum. Apply The Parkhill Mfg. Co., Limited, 400 St. Ambroise St., Montreal. c18m

SECOND-HAND 26" NEWTON TYPE COLD saw cutting-off machine, arranged for motor belt drive and complete, with or without motor. Price $600.00, cars Sherbrooke. MacKinnon, Holmes & Co., Limited, Sherbrooke, Quebec. c10m

FOR SALE—1 90-FT. THOMAS SPACING table complete, including one indicator carriage, one trolley carriage, stands, adjustable roller, racks, etc. Adjustable as to length. The Manitoba Bridge & Iron Works, Winnipeg, Man. c15m

FOR SALE—1 NEW 25 H.P. HOR. TUBULAR boiler, 1 second-hand 12 H.P. hor. tubular boiler, tested to 150 lbs.; 1 second-hand 50 H.P. loc. boiler; 1 second-hand Leonard 12 x 12 high speed engine; 1 second-hand 500-lb. belt-driven Beaudry power hammer, only in use two months; in perfect condition. Canadian Engineering & Mfg. Co., 128 Bleury St., Montreal, Que. c9m

HYDRAULIC EQUIPMENT FOR SALE—THE equipment listed below is in first-class shape having only been used about three months. Blue prints and specifications and foundations drawings will be furnished. 2—14 x 12 x 5" Fairbanks-Morse duplex steam driven high pressure pumps at 80 gals. per minute capacity each against 600 lbs. pressure, steam pressure 150 lbs. 1—Weighted Accumulator good for 1000 lbs. per sq. inch, 16" diameter, plunger 11 ft. stroke with squeezing water cushion and wooden outside bumper blocks. The tank for the weighing material surrounding the cylinder is 10' 7" in diameter and 11' 0" high. 1—Return Suction Tank for above pumps and accumulator. Height, 9' 0", diameter 8' 0". Capacity, 2700 Imperial gallons. This equipment can be shipped immediately and is open for inspection at the company's plant. Prices on application. The Canadian Copper Company, Copper Cliff, Ont. c8m

AGENCIES WANTED

ENGINEER AND BUSINESS MAN WITH office in Manchester, England, is prepared to work for a good firm desiring representative in England. Would attend to the interests of a firm shipping munitions. Box 337, Canadian Machinery. c19m

SPECIAL MACHINERY

H. C. THOMAS, GENERAL MACHINE SHOP, tools, jigs and machine repairs. 301 King St. W., Toronto. Telephone Adelaide 3836. tf

MANUFACTURERS—WE CAN UNDERTAKE work to any specification—munition production equipment or otherwise. Write W. H. Sumbling Machinery Co., 7 St. Mary St., Toronto

SITUATIONS WANTED

TOOL MAKER — ACCURATE, GOOD draughtsman desires responsible position. Box 330, Canadian Machinery. c14m

GENERAL SUPERINTENDENT DESIRES position with reliable firm. Possess years of practical machine shop experience as well as production methods, including shell work. Box 338, Canadian Machinery. c18m

GRADUATE MALE NURSE, AGE 32. HAVE established hospitals for three large manufacturing concerns. Familiar with social service, accident prevention and modern methods of employing. At present employed. Less than $2,400 not considered. Box 336, Canadian Machinery. c15m

MACHINE SHOP FOREMAN DESIRES change as shop foreman or master mechanic. Acquainted with scientific management; 26 years' experience. Box 328 Canadian Machinery. c11m

A PRACTICAL MACHINE SHOP SUPERINtendent of broad experience in Canada and States wants position as superintendent or general foreman. Large or small shop on ammunition or machinery; A1 references. Address Box 327, Canadian Machinery. c9m

WORKS MANAGER OR GENERAL SUPERintendent open for engagement—28 years' experience as machinist, toolmaker, inspector, superintendent of tool-making and tool-designing, experimental and development work, heat-treating and testing of steel in raw and finished state; shop superintendent, works manager. Experience has been on rifle work, electrical work, typesetting machines, lock-making and bridge-work. Correspondence solicited, and can furnish good references. Address Box 332, Canadian Machinery. c14m

We require a high-class

Specialty Salesman

for Montreal Territory, Engineering graduate preferred, good prospects offered.

Apply in writing only to

Canadian SKF Co., Ltd.
47 King St. W., Toronto

WANTED

WANTED—SMALL SECOND-HAND POWER press, in good condition. Hosmer Stamping & Die Works, Ltd., 831 Dundas St., Toronto, Ont. c13m

WANTED—SECOND-HAND POWER SQUARing shear to cut No. 10 gauge steel up to 24" wide. Must be in good working condition. Packard Electric Company, St. Catharines, Ont. c4m

SITUATIONS VACANT

SHOP SUPERINTENDENT—WANTED, MAN competent to take entire charge of machine shop solely engaged in manufacture of small tools. Must be thoroughly competent and have had some years' experience. Shop while small at present offers excellent opening for advancement. Apply, stating experience, salary, etc., to Box 339, Canadian Machinery. c17m

WANTED — FOREMAN BLACKSMITH FOR Montreal shop on general work. Six forges and 1,500-lb. steam hammer. Must be a hustler. Apply, in confidence, stating experience and wages expected, to Box 335, Canadian Machinery. c15m

WANTED — MECHANICAL DRAUGHTSMAN for engine, compressor, and general work. State experience and salary expected. Apply The Jenckes Machine Company, Limited, Sherbrooke, Que. c16m

FOR SALE

4—14 x 6 Flather Engine Lathes, C.R., Q.C.G., new.

4—14 x 5 Reed Engine Lathes, R. & F.

3—18 x 8 Davis Engine Lathes, D.B.G.

1—18 x 10 Rahn-Larmon Engine Lathe, new.

1—18 x 12 Rahn-Larmon Engine Lathe, new.

1—22" x 10' Nicholson & Waterman Engine Lathe.

1—No. 13 B. & S. Automatic Gear Cutter.

1—30" Newark Automatic Gear Cutter.

1—5 x 48 Pratt & Whitney Plain Grinder.

1—No. 2 Bath Universal Grinder.

1—12 x 60 Modern Plain Grinder, new.

2—Lees-Bradner Thread Millers.

1—30 x 30 x 8' Powell Planer, new.

Brownell Machinery Co.
Providence, R. I.

COMPLETE 8-INCH SHELL PLANT

Capacity—2,000 per week

MACHINES ARE TOOLED FOR BRITISH 8 IN. HOWITZER SHELL BUT CAN EASILY BE CHANGED OVER FOR 6 IN. SHELL

TOOL ROOM

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1 [illegible] Grinder.
1 Drill Grinder.
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1 RALINE [illegible]
1 HENRY & WRIGHT Sensitive Drill.
1 20" McDOUGALL Drill.
1 BARNES [illegible]
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SHELL PLANT.

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FOR SALE

The following used machinery, guaranteed to be in first-class condition, at lowest prices:—

2 LeBlond Heavy Duty 19" x 8' Engine Lathes.

1—Fay Scott Engine Lathe, 24" x 8', with extra turret.

1—LeBlond Engine Lathe, 17" x 6'.

1 14" x 7' Niles Engine Lathe.

1—16" x 8' Butler Engine Lathe.

1—Boring Lathe for 9.2 or 12" shells.

1—Turning Lathe for 9.2 or 12" shells.

2 No. 50 Foster Turret Lathes, 16" swing.

4 John Hall & Sons No. 4 Cutting-off Machines.

1 Wilmarth & Morman Wet Tool and Twist Drill Grinder.

1—Banfield Plug Milling Machine.

2—Otis-Fensom Bench Thread Millers.

1—Cincinnati Universal Milling Machine, No. 3 cone drive.

1—Surface Grinder.

1—Gardner Grinder, No. 4, complete with discs.

1—Gould Triplex Hydraulic Pump, Fig. 997, single acting, 1¼" x 6".

1—Holden-Morgan Marking Machine.

2—Northern Electric Co.'s Electric Soldering Irons.

1—1/15 H.P. General Electric Motor.

1—Brown-Boggs Nosing Press, No. 320.

1—Hisey Wolff Grinder, Portable Electric.

1—Dumore Grinder, Portable Electric.

8—Mech. Engr. Co. Fuel Oil Burners.

4—Mech. Engr. Co. Fuel Oil Burning Furnaces, 24" x 36".

1—Gilbert & Barker Fuel Oil Burning Furnace, 24" x 36", C-15.

6—Gilbert & Barker Fuel Oil Burners, 2".

2—Gilbert & Barker Positive Pressure Blowers, 3".

2—Canadian Buffalo Forge Co. Blowers, No. 6, 30".

1—Portable Blacksmith's Forge.

1—Circular Banding Press, suitable for 18-pdr. shells.

4—Shore Instrument Co.'s Scleroscopes.

3—Resin Pots, Simplex Electric Co.'s make.

3—Chapman Double Ball-bearing Trucks.

2—Oil Quenching Tanks, 8' long x 3' 4" wide x 2' 6" deep water jackets.

1 Bury Air Compressor, 6 x 8.

2—Brown Instrument Co.'s Pyrometers.

1 Thwing Pyrometer.

3—Fairbanks 25-lb. Scales.

1—International Time Clock for 200 men, with racks for tickets.

1 Voltmeter, Western Electric Instrument Co.'s make, 0-200, model 155

Private sale of small tools, rotary pumps, vises, pulleys, belting and shafting, etc., etc., to be held on Oct. 6th, at Midland, Ont.

For Further Information Apply to

Zenith Coal & Steel Products, Limited

MONTREAL—402 McGill Building
TORONTO—1410 Royal Bank Bldg.

c16m

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We Own Every Tool Offered

NEW MACHINE TOOLS

For Immediate Delivery

2 x 8 Springfield Q.C.G. Engine Lathes
1 18 x 8 Springfield Standard Engine Lathe
2 16 x 8 Springfield Q.C.G. Engine Lathes
2 16 x 6 Springfield Q.C.G. Engine Lathes
1 14 x 6 Springfield Geared Head Engine Lathe
1 1" Springfield B.G. Shaper
1 ¾" Springfield B.G. Shaper
1 25" Springfield B.G. Shaper
1 30 x 30 x 10' Wilson Two-end Planer
1 14" Pierce Turret Lathes.
1 No. 3 Pierce Hand Screw Machines
1 No. 1½ American Milling Machine
1 No. 2B Bliss O.B.I. Press
1 No. 3B Bliss O.B.I. Press
1 No. 3BT Bliss O.B.I. Press
1 No. 18 Bliss O.B.I. Press.
1 ¾" Buffalo B.G. P.F. Drill Presses.
1 ¾" Canedy-Otto B.G., P.F. Drill Presses.
1 ¾" Champion B.G. P.F. Drill Presses
1 ¾" Champion Plain Drill Press
3—20" Silver Plain Drill Presses.
1 ¾" Canedy Otto Plain Drill Press
1 14" Champion Plain Drill Presses

USED MACHINERY

ENGINE LATHES.

1—28 x 10 Hamilton Standard Engine Lathe, with turret.
1 22 x 14 Putman Standard Engine Lathe.
1—22 x 10 Reed Standard Engine Lathe.
1 18 x 6 Jones & Lamson Standard Engine
1—16 x 8 Potter Standard Engine Lathe.
1—16 x 8 Reed Stud Lathes.
1 14 x 8 Sebastian Engine Lathe.
1—14 x 6 Springfield Engine Lathe.
1—14 x 6 Prentiss Engine Lathe.
1 14 x 6 Sebastian Engine Lathe.
1—14 x 6 Van Werk Engine Lathes.
1 13 x 8 Barnes Engine Lathe
1 13 x 5 Barnes Engine Lathe
1 10 x 4 Sebastian Engine Lathe.

TURRET AND SCREW MACHINES.

2—No. 6-A Potter & Johnston Automatic Lathes.
1—4⅛" Gridley Automatic Screw Machine, motor driven
1 4" Potter F.G.H. Hand Screw Machines
1 5" Pierce F.G.H. Hand Screw Machine.
4—12" Warner & Swasey Turret Lathes with air chucks
1 10" Warner & Swasey Turret Lathes with air chucks
2—2" Cleveland Automatic Screw Machines, nigger feed.
1 No. 1 Cleveland Automatic Screw Machines nigger feed

MILLING MACHINES AND GRINDERS.

1—No. 2 Hendey Plain Milling Machine.
1 No. 0 Brown & Sharpe Plain Milling Machine.
1—No. 1 Cincinnati Plain Milling Machine.
2—No. 13 Pratt & Whitney Lincoln Type Milling Machines.
5—No. 1½ Knight Milling and Drilling Machines.
Fox Milling Machines.
1—Garvin Hand Miller.
1—No. 2½ Bath Universal Grinder.
1 No. 12 Modern Plain Grinder.
1 No. 1 Landis Internal Grinder
1 No. 2 W. & M. Surface Grinder.
1—No. 3 W. & M. Surface Grinder.
1—Miami Valley Universal Cutter Grinder.

DRILL PRESSES.

1—5' Mueller Plain Radial Drill, old type.
1 ¾" Niles Bement, Pond B.G. P.F. Drill Presses.
1—3-spindle 3" overhang Henry & Wright High speed Drill.
4—6-spindle Fox High Speed Drills.
2—4-spindle Fox High Speed Drills.
1—16-spindle Natco Drill.

SHAPERS AND PLANERS.

1 24" Lodge & Davis Geared Shaper.
1 18" Hendey Geared Shaper.
1 24 x 24 x 7' New Haven Planer, S.H.
1 25 x 25 x 8' Cincinnati Planer, S.H.
1 16 x 16 x 5' Hendey Planer, S.H.

PRESSES AND HAMMERS.

1—Waterbury Farrel O.B.I. Press, geared.
1—No. 30 Perkins Drawing Press.
2 No. 2W Bliss Wiring Presses.
1—300-lb. B. & S. Roll Board Hammer.
1—800-lb. P. & W. Roll Board Hammer.
1 2-lb. Beaudry Steam Hammer.
1—25-lb. Fairbanks Belt Hammer.

We also carry a large stock of Steam Engines, Steam Pumps and Electrical Equipment of all kinds.

We are in the market to purchase machine tools, both large and small.

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Eastern Machinery & Equipment Co., Inc.

319 COMMERCIAL TRUST BLDG.
PHILADELPHIA, PA.

NEW TOOLS FOR IMMEDIATE DELIVERY.

2 No. 3 Hendey Universal Milling Machines.
1—2½ x 2" Wm. Sellers Tool Grinder.
30—18" x 9' Turning and Boring Lathes.
3—Double head Sullivan Grinders.
1—32" x 12' Pittsburgh Engine Lathe.

USED MACHINERY

ENGINE LATHES.

8—30" x 10' American, Gear Head, A-1.
1—20" x 10' Bullard.
3—24" x 14' American.

TURRET LATHES.

36—Potter & Johnson 6A Automatic Turret Machines.
3 3 x 36 Jones & Lamson Flat Turret.
2—2¼" x 24" Jones & Lamson Flat Turret, bar equipment. Full set Turret Tools.
9—25" Gisholt Chucking Lathes, 6½" hole in spindle, square turret.
14" x 6' Lodge & Shipley Turret, back geared.
5—24" Gisholt, 2-step cone, 6¼ H.S.

BORING MILLS.

6—66" swing Bement-Miles Tire Turning Mills, two swivel heads, 151½" under rail
1—37" Baush Boring Mill, 2 heads; good as new.
1—Cylinder Boring Mill, capacity of 24" diam. to 96" diam., 10' long.
Tool equipment included, good as new.
1—42" Bullard Boring Mill (2) heads.

MILLING MACHINES.

1—No. 3 LeBlond Plain Miller, table 13½ x 54¼.
1—24" x 8' Beaman & Smith Open Side Slab Miller, with two vertical spindles.
1—No. 1½ Universal Milling Machine.

SCREW CUTTING MACHINES.

2—2¾" Cleveland Automatic, Model A.
1—1¼" Cleveland Automatic, Model A.
1—2" Cleveland Automatic.
1—No. 55 National Acme, 4 spindle; good as new.
1—No. 54 National Acme, 4 spindle; good as new.

GRINDERS.

1—1½" Full Universal Landis Machine.
1—No. 13 Brown & Sharpe Universal and Tool Grinder. Full equipment.
No. 1½ Universal Cutter and Reamer Grinder.
5—Fisher Profile Grinders for Cutters.
5—No. 6 Std. Universal Tool and Cutter Grinders.

DRILL PRESSES.

1—4' Prentice Radial Drill, tapping attachment.
1—2' 6" Fosdick Radial Drill, tapping attachment.
1—5' 6" Full Universal American Radial Drill, tapping attachment.
2—D1 Colburn Heavy Duty Drills, latest pattern.
2—D3 Colburn Heavy Duty Drills, tapping attachment, latest pattern.

FOR SALE

One 22" x 50" Wheelock Engine, left-hand, arranged for direct shaft coupling, with heavy balance wheel 8¼" x 14" x 17'—7" in dia.

Merchants Rubber Factory
KITCHENER, ONTARIO

p1h

Slightly Used Machinery For Immediate Delivery

1—No. 21 Landis Floor Grinder (Canada), Hart Wheel Mfg. equipped with two 12" wheels and two spindles for same. Shaft length 61" long.
1—Heavy Blount Double Floor Grinder, 45" spindle, two 8" wheels.
1—Heavy Blount Floor Grinder. No rest or countershaft. Shaft 36" long, two 9" wheels.
1—Stouffville Floor Grinder. No rest or countershaft. Shaft 32", two 8" wheels.
1—Large Polishing Stand (new) 4' shaft, bearings 1¼" x 6.
1—Brown & Boggs Lever Splitting Shear.
1—Hanson & Van Winkle Polishing Stand (no c/s)
1—Hanson & Van Winkle Polishing Stand. Shaft 5', bearings 2½" x 10".
1—No. 1 Landis Pipe Machine, 1½".
2—Heavy Grinders, Bearings 2¼" x 12"—cross adjustment slide, one 12" wheel.
1—8-Wheel Robinson Detroit Grinder.
1—Anvil, 154-lb.
1—Revolving Electric Plating Machine.
1—Plating Electric Dynamo, 600 Amperes.
1—Tumbling Barrel, 18" x 4.
1—No. 23 Brown & Boggs Hand Punch and Shear.
1—Fairbanks Scale, 5-ton.
1—Hand Former, Toggle Type.
1—40 H.P. Westinghouse, 550-volt, 60-cycle, 3-phase, 850 R.P.M.
3—Westinghouse Transformers, 30KW., 3,200-550-volt.
1—2⅛" Dreses Turret Lathe, power feed, oil pan, spring chuck. No. 1722.
1—No. 2 Warner & Swasey Turret Lathes, power feed, oil pan, spring chucks.
1—No. 3 Garvin Turret, oil pan, spring chuck, 2⅛" hole.
1—No. 1½ Garvin Monitor Lathe, oil pan, spring chuck.
1—1¼" Davis & Egan Lathe, oil pan, spring chuck.
1—2" Pratt & Whitney Turret Lathe, spring chuck.
1—32½ Garvin Turret Lathe, spring chuck.
1—12½ Garvin Turret Lathe, spring chuck.
1—Style "F" Single Spindle, heavy duty, Baker Drill.
1—Four Spindle Rockford Drill Press, 20" box column, back-geared, automatic feed, automatic stop, with pump connection.
1—Garrison Press, 26,000-lb.
1—Heavy Thread Cleaning Attachment.
1—No. 3 Cincinnati Universal Miller with Dividing Heads.
1—No. 2 Cincinnati Universal Miller with Dividing Heads.
1—No. 2 West Tire Setter Band Press.
1—No. 3 West Tire Setter Band Press.
1—Cincinnati Bickford 24" Drill.
1—Cincinnati Upright 24" Drill with tapping attachment.
2—No. 25 Foote-Burt Drills with belt guards.
2—D2. Colburn Drills with belt guards.
1—Niles-Bement-Pond 50" Drill Press.
1—No. 400 Brown & Boggs 42" Geared Gap Shear.
2—No. 21 Crosby Presses.
1—300-lb. Bliss Board Lift Hammer.
1—100-lb. Bliss Board Lift Hammer.
1—Barnes 24" Geared Drill

Write For Particulars.

Garlock-Walker Machinery Company, Limited

32 FRONT STREET WEST, TORONTO, ONT.

"EVERYTHING IN MACHINERY"

IMMEDIATE DELIVERY

DRILLING MACHINES

20" Monarch.
22" Sibley, S.H., B.G., P.F.
30" Lodge & Davis, S.H., B.G., P.F.
24" Gang Plate Reamer.
24" Hendey Plate Reamer, spindle plate adjustment.
1 Modern Plate Reamer.
1 No. 10 Radial Drill.
3-spindle Rockford.
4-spindle Rockford.
4-spindle Westinghouse, plate reamer.
4-spindle Allen.
No. 11 Pratt & Whitney 11 spindle.

GEAR CUTTERS.

24" x 8" G. & E. spur gears.
No. 3- 26" B. & S., spur gears.
30" x 8" G. & E. spur gears.
36" x 8" G. & E. spur gears.
36" Walcott, spur gears.

GRINDERS.

No. 18½ Wet Emergency Reamer.
No. 2 B. & S. Universal.
No. 2 Wet Tool and Cutter.
Brainard Cutter.
No. 2 Landis Universal.
No. 21 Landis Plain.
No. 1 Cincinnati Pipe.
No. 24 Gardner Disc.
No. 6-A Diamond Universal.

LATHES.

10" x 4' Seneca Falls, C.R.
13" x 6' P. & W. screw machine.
24" x 6' Pedrick, C.R.
6' x 6' LeBlond, C.R., taper attachment.
6' x 6' Rockford, C.R.
6' x 6' Rockford Tool Co., C.R.
8' x 8' Bradford, C.R.
8' x 8' Bradford, C.R., taper attachment.
8' x 8' Lodge & Shipley, pat. type, C.R. taper attachment.
10' x 10' Fitchburg, C.R.
14' x 14' Blaisdell, C.R.
12' x 12' New Haven, C.R.
18' x 18' Schumacher & Boye, T.B.G., Q.C.G.
20' x 20' American, T.B.G.
16' x 16' Fifield, C.R.
28' x 28' Hamilton, T.B.G., raising blocks to swing 54".

PLANERS.

24" x 24" x 8' Gray, one head.
24" x 24" x 8' American, one head.
26" x 26" x 8' Gray, one head.
26" x 26" x 8' Pease, one head.
30" x 30" x 8' Gray, two heads.
30" x 30" x 8' American & Pease, one head.
36" x 36" x 8' Gray, one head.
42" x 42" x 8' New Haven, one head.
50" x 50" x 18' New Haven, two heads, two extension heads.

SCREW MACHINES.

No. 1 P. & W. screw machine.
No. 2 Foster, plain head, A.C. and W.F.
No. 3 Bardons & Oliver, plain head, A.C. and W.F.
No. 4 Pearson, friction head, A.C. and W.F.
No. 5 Foster, geared friction head, automatic chuck, power feed to turret slide and power feed to cross slide.
No. 6 Foster, geared head, automatic chuck and wire feed, power feed to turret slide.
2¾" Cleveland Automatic.
1¾" Gridley 4-spindle Automatic.
3¼" Gridley 1-spindle Automatic.

TURRET LATHES.

No. 2 Foster-Kimball, plain head.
No. 22 Garvin, plain head.
No. 1 Ludlow & Davis, back geared.
No. 2 Warner & Swasey, friction head.
No. 2 J. & L. screw head.
24" Gisholt, 4¼" spindle hole, taper attachment.
No. 4A Warner & Swasey, tap attachment.

PUNCHES AND PRESSES.

No. 3½ Bliss, back-geared, pinion geared.
Blake & Johnson Embossing.
No. 3A Lennox Double End Punch and Shear.
No. 4 Long & Allstatter Single End Punch and Shear, 3" throat, new.
No. 4 Long & Allstatter Single End Punch and Shear, 3" throat, new.
No. 4 Long & Allstatter Single End Punch and Shear, 1¾" x ¾", 24" throat; new.

MISCELLANEOUS.

24" Bullard Vertical Turret Lathe, turret head and one side head.
No. 00 Brown Keyseater.
4-spindle Warner & Swasey Valve Milling Machine.
No. 3 Cincinnati Vertical Milling Machine.
No. 3 Burr Cold Saw.

STOCKER-RUMELY-WACHS COMPANY

117-121 No. JEFFERSON STREET CHICAGO, ILLINOIS

If any advertisement interests you, tear it out now and place with letters to be answered.

POWER EQUIPMENT

(Partial List)

Two 5,000 cu. ft. Laidlaw-Dunn-Gordon Duplex Air Compressors, rope drive
707 cu. ft. Norwalk Tandem Compound Straight Line Air Compressor
425 cu. ft. Clayton cross compound Duplex Air Compressor
425 cu. ft. McKernan cross compound Duplex Air Compressor
12″ and 18½″ x 8½″ x 10″ Worthington Duplex Compound double action pump
8″ x 12″ x 12″ Marsh Steam Pump
12″ x 7″ x 12″ Buffalo Duplex Pump, 360 gals. per minute
No. 8 Buffalo Double Suction Centrifugal Pump, engine driven
60″ x 8′ Closed Pressure Tank.
6′ x 10′ Open Iron Tank
41½″ x 24″ Lidgerwood Single Drum Hoist, with 38 H.P. General Electric D.C. Motor
9″ x 10″ Lidgerwood Double Cylinder Hoist
105 K.V.A. Engine-Generator Set
100 K.W. Sturtevant Generator Set, engine driven
100 K.W. General Electric continuous current Generator
50 K.W. American Ball Generator, engine driven
50 K.V.A. Engine-Generator Set
40 K.W. Fisher D.C. Generator
20 K.W. Compound Generator, Type MP, 250 volts
Three 75 H.P. Westinghouse Motors, 3 phase, 60 cycle, 440 volts
25 H.P. General Electric Motor, 3 phase, 60 cycles, 200 volts
25 H.P. General Electric Motor, D.C., 250 volts
25 H.P. Western Electric Motor, D.C., 125 volts
15 H.P. Bullock Motor, D.C., 220 volts
15 H.P. General Electric Motor, D.C., 230 volts
10 H.P. General Electric Motor, D.C., 220 volts
10 H.P. Browning Motor, D.C., 230 volts
110″ Buffalo Steel Plate Fan, engine driven
15″ x 14″ Ames Center Crank Automatic Engine
12″ x 12″ Ames Center Crank Automatic Engine
10″ x 10″ Ames Automatic Engine
8″ x 8″ Doregan & Swift Vertical Steam Engine
8″ x 8″ O. & S. Upright open type Engine
10 H.P. White & Middleton Gas Engine
60 H.P. Wooley Gas Engine
32″ x 120″ Kelly-Berriman Feed Water Heater
70 H.P. Erie City Boiler Works Locomotive Boiler, 100 lbs. pressure
15 ton Speidel Chain Block
Toledo Electric Spot Welder, 60 cycle, 220 volts
Allis-Chalmers Gates Works Rock and Ore Crusher, Size 4K, weight 22,000 lbs.

New York Machinery Exchange, Inc.

50 Church Street . · . New York City

MACHINE TOOLS IN STOCK

No. 4 Cincinnati Universal Miller with vertical attachment and power feed Rotary Table.
No. 3 LeBlond Universal Miller.
No. 1½ NEW American plain Millers.
5—No. 0 NEW Steptoe Hand Millers.
1″ x 15″ Pratt & Whitney Screw Machine.
28″ x 16′ Reed Lathe.
24″ x 10′ NEW Carroll-Jamieson heavy duty lathe.
20″ x 6′ Davis lathe.
20″ x 10′ Hamilton lathe.
6—19″ x 8′ NEW, Sidney D.B.G. quick change lathes, swing 21″ over V's.
3—17″ x 8′ NEW, Sidney D.B.G. quick change lathe, swing 19″ over V's.
15″ x 6′ NEW, Sidney D.B.G. quick change lathe, swings 17″ over V's.
12—17″ x 8′ NEW, National quick change.
15″ x 6′ NEW, Carroll-Jamieson, quick change.
48″ Harrington plain Radial Drill.
36″ Dresses plain Radial Drill.
D-4 Colburn high duty Drills.
3—20″ Rockford high duty Drills.
16″ Queen City B.G. Shaper.
400 lb. Single Frame Steam Hammer.
125 lb. Dupont Belt Hammer.
30 Ton Watson & Stillman Hydraulic Press.

FRANK TOOMEY, INC.

127-131 North Third St., PHILADELPHIA, PA., U.S.A.

We Have for Immediate Delivery the Following Second-hand Machinery in Good Operative Condition

1 Landis No. 3 Universal Grinder 12″ x 42″, complete equipment, less internal grinding attachment. . $1,500

1 Gisholt Turret Lathe, 21″, complete with boring bar equipment and countershaft $2,200

1 Gisholt Turret Lathe, 21″, complete with boring bar equipment and countershaft $1,800

These machines are particularly good value, and may be seen at our works.

A. B. JARDINE & COMPANY
HESPELER, ONT.

STOP — LOOK — INQUIRE

[illegible]

—Betts Knee Type 3" bar.

[illegible]

drive.

[illegible]

[illegible]

DRILLING MACHINES—Heavy Duty

2—NEW No. 2 [illegible]
steel
4—No. 30 Baker Single Pulley Drive

DRILLING MACHINES—Multiple

DRILLING MACHINES—Multiple

drive.

DRILLING MACHINES

GEAR CUTTING MACHINES

GRINDERS—Plain

1 NEW

GRINDERS

GRINDERS—Tool

1 No. 60 Heald, single pulley drive

GRINDERS—Universal

GRINDERS—Surface

GRINDERS

4—NEW No. 2 Reid (same as B. & S.)

HAMMERS—Board-Lift, Drop.

1—E. W. Bliss, 800 lb.

HAMMERS—Steam Forging

1—7,000 lb. Morgan Special Double Stand.

KEYSEATERS

KEYSEATERS

American shells.

5—30" x 10' Hindman, high duty.

LATHES—Engine

2—NEW 20" x 10' Cleveland Geared Head

19—NEW 21" x 10' Porter, S.B.G.

1—38" x 18' Schumacher & Boye, triple geared, quick change

1—60" x 12' American Gear Head, quick-change

LATHES—Turret

14—6A Potter & Johnson.

MILLING MACHINES—Knee Type

1 No. 2 Kempsmith, vertical attach.
1 No. 2 Kempsmith, 13" dividing head.

MILLING MACHINES—Knee Type

3 NEW No. 1 Rockford, without column.
3 NEW No. 3 Rockford, on column, power feed.

MILLING MACHINES—Universal

1—NEW Bickett, No. 0
1 No. 3 Brown & Sharpe.

MILLING MACHINES—Planer Type

1—Ingersoll Slab, 15" x 48" cap.
x 12'.
with motor.

MILLING MACHINES—Duplex Type

PLANERS

24" x 24" x 8' Cincinnati, one head, used three months

new, arranged for motor drive.

SCREW MACHINES—Hand

2—NEW No. 10 Foster, geared friction head, power

SCREW MACHINES—Automatic

1—NEW 2¾" Gridley Mult. Spindle, belt driven.
2—No. 0 Brown & Sharpe.
1 No. 516 National Acme.

SHAPERS

SLOTTERS

W. F. DAVIS MACHINE TOOL COMPANY

CHICAGO, ILL.
549 Washington Blvd.

CINCINNATI, OHIO
Union Central Life Bldg.

CLEVELAND, OHIO
Leader News Bldg.

NEW YORK CITY
Singer Bldg.

WRITE OR WIRE OUR NEAREST OFFICE FOR QUOTATIONS
THIS IS ONLY A PARTIAL LIST OF AVAILABLE MACHINES

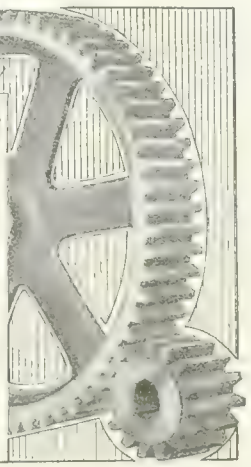
If any advertisement interests you, tear it out now and place with letters to be answered.

SPECIAL MACHINERY

Special Machinery, Gears, Jigs, Fixtures, Punches and Dies, Small Tools, Screw Machine Products, Gauges, Etc.

CONTRACT WORK

CUT GEARS



Rawhide — Steel — Brass — Cast Iron

Try our W-G Rawhide Silent Gear. Designers and Builders of Special Machinery.

Winnipeg Gear & Engineering Co.
197-199 Princess St., Winnipeg, Man.

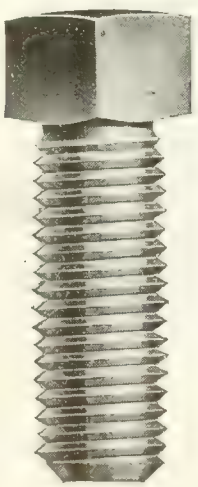
F. W. McCLEAN & SON

CONSULTING AND MECHANICAL ENGINEERS
NIAGARA FALLS ONTARIO

Designers and Builders of Special and Automatic Machinery. Experimental and Metal Pattern Work. Electric Welding Machinery. Wire Forming Machinery.

WELLAND MOTOR & MACHINE CO.
WELLAND, ONT.
Builders of Special Machinery,
JIGS, GAUGES AND SPECIAL TOOLS.
General Machine Shop Work of all Descriptions.
Bids Submitted on all Classes of Contract Work.

ACCURACY



The discriminating buyer is the one we like to meet—the one who insists on accurate product. He will eventually buy "GALT" Cap and Set Screws because they measure up to his standard.

Your rush orders for S. F. Hex. nuts taken prompt care of. Better finished nuts—try a sample.

THE
GALT MACHINE SCREW CO.,
LIMITED
GALT, ONTARIO

Eastern Representatives: The Canadian B. K. Morton Company, Limited, 49 Common St., Montreal, Que.

Shell Manufacturers

Get our Prices on Gauges, Boring Bars Rough Turn Drivers, Etc., for 6 in. SHELL.

GENERAL MACHINE WORK

Brass and Aluminum Castings

Prompt Delivery

THE
MONARCH BRASS MFG.
COMPANY, LIMITED

71 Browns Ave., - Toronto, Ont.

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.

SPECIAL MACHINERY

Special Machinery, Jigs, Fixtures, Punches and Dies, Small Tools, Screw Machine Products, Gauges, Forgings, Etc.

CONTRACT WORK

SPECIAL MACHINERY

SMALL TOOLS OF EVERY DESCRIPTION

MADE IN BR·EN·CO CANADA

Brown Engineering Corporation
LIMITED, TORONTO
415-419 King St., W. Tel. Adel.425

Homer & Wilson
Stamping & Tool Works

WE MAKE THE TOOLS
AND
PRODUCE THE STAMPINGS

Let us quote on your requirements.

1-3-5 Lancaster Street
Hamilton, Ontario

PUNCH PRESS WORK

What Can You Save?
By Using Parts Made in the Punch Press

Look over your standard parts, Mr. Manufacturer, and see what parts can be made (or could be made by slight change in design) by this process.

You will be surprised at the saving you can effect.

We make Blanking, Perforating, Drawing, Forming and all classes of dies and tools for plain or difficult stamping to suit the production required.

A Battery of presses is also available at our plant to manufacture parts for you with the understanding that you pay only for good parts made. Our facilities ensure prompt deliveries at right prices.

W. H. BANFIELD & SONS LTD.
370-386 PAPE AVE., TORONTO.

OVER 50,000 COPIES PER MONTH

Canadians

should be thankful that our Country has a Canadian Magazine fit to take its place in the company of the big American magazines — a magazine equalling in interest and literary merit the big magazines produced in a Country of 100,000,000, where it is possible to obtain $1,000 to $5,000 a page per issue or more for advertising space.

THE making of MACLEAN'S MAGAZINE month by month, year after year, has been hard labor. One difficulty was to get the right sort of matter—Canadian in origin and theme. A few years ago our country possessed few writers and artists of trained and high ability. To-day, thanks very largely to MACLEAN'S MAGAZINE, we have men and women writers and artists producing first-class work; they developed when they found a medium demanding a grade of work equalling the best contributors to American magazines. Also, the Canadian writers and artists who were finding a market for their wares in the United States turned to MACLEAN'S when this magazine showed itself to be a sufficient and creditable vehicle for their work.

The future has a good crop of A1 Canadian writers and artists in store, whose work will appear in MACLEAN'S; but consider these names of Canadian men and women who have already "arrived," and whose work appears in MACLEAN'S MAGAZINE:—

Sir Gilbert Parker,	E. Phillips Oppenheim,
Arthur Stringer,	Peter McArthur,
Arthur E. McFarlane,	L. B. Yates,
Stephen Leacock,	Geo. Eustace Pearson,
Robert W. Service,	W. A. Craick,
Alan Sullivan,	H. F. Gadsby,
Agnes C. Laut,	C. W. Jefferys,
L. M. Montgomery,	J. W. Beatty,
"Janey Canuck,"	Arthur William Brown,
A. C. Allenson,	Lou Skuce.

These are some of the names of Canadian men and women—writers and artists who are doing work of the highest class, acceptable to the hardest-to-get-into publications of the United States. Ten years ago such a Canadian galaxy had no existence.

BESIDES these professional writers and artists—men and women who depend on their pen and pencil and brush for their livelihood—is a big host of others who write only when successfully urged to do so—because they have something to say that is worth saying. These are usually men in a big way of business, or professional men at the top of the ladder, or men and women doing unusual work of a most important sort—often obscurely because they are not self-trumpeters of their achievements or labors. For example, such men and women as:—

THE LATE SIR MORTIMER CLARK
JOHN BAYNE MACLEAN
ERMAN J. RIDGWAY
LORD NORTHCLIFFE
JOSEPH MARTIN, M.P.
BILLY SUNDAY

All these have contributed under their own name or a nom de plume to MACLEAN'S MAGAZINE in the last 12 or 15 months, recognizing that this magazine can give their messages to the whole nation, and to a class of persons whom they wish to reach.

NOBODY who knows MACLEAN'S would ever call it a story magazine, but rather a national magazine—almost a news magazine. Stories there are in every issue—enough of them to satisfy the right and natural desire for romance, adventure, achievement, business, love and intrigue. But the greater part of the contents of every issue of MACLEAN'S MAGAZINE may be called **NEWS**—NEWS of men and their work and triumphs; news of the nation's work and workers; news of discoveries; news of movements; news of politics; news of the builders and building of Canada. MACLEAN'S, as Canada's National Magazine, prepared for thinking and intelligent men and women, must be an informative and interpretive magazine, must mirror national opinion, record national affairs and developments, and be the **VOICE** of prophets, statesmen and leaders. MACLEAN'S is a magazine of to-day—a newspaper of a sort, dealing with big news passed over by daily newspapers whose function is the recording of the day's news—passing news; and who leave the fuller statement—the summed-up presentation of things they can but touch on—to MACLEAN'S MAGAZINE.

A Magazine *of* Power

News features of MACLEAN'S MAGAZINE greatly liked by its 50,000 readers are

The Business Outlook—article.
The Investment Situation—article
The Review of Reviews Department.
The Nation's Business.
Women and their work.

These are regular department features appearing in every issue of MACLEAN'S. They are of the nature of surveys or digests, and perform a service welcomed and praised by all readers who aim to keep themselves broadly informed concerning what's doing in Canada and what's being thought and said and done the wide world over.

REVIEW of Reviews is the outstanding feature of MACLEAN'S, in that it gives the best articles, in condensed form, from the best magazines of the world. A staff of trained people read and study the contents of all magazines and select for each issue of MACLEAN'S twenty or more articles which mirror the world's progress and present the changing aspects of world opinion.

IN rounding out this presentation of Canada's National Magazine a brief reference may be made to one large and discriminating and important class of contributors to it—advertisers. Literally hundreds of them employ MACLEAN'S for their advertising, to reach the influential classes represented by MACLEAN'S list of subscribers, and because they get national publicity economically. These makers and producers of goods of national consumption appreciate the fact that a select circulation of 50,000 gives them, among the most important families of Canada, strong local publicity as well as broad national publicity, and that retail distributors are both canvassed and assisted by their national advertising in MACLEAN'S MAGAZINE. They recognize that $1,000—$3,000 invested in space in MACLEAN'S MAGAZINE to buy 365-day national influence is dirt cheap publicity.

THIS is but condensed presentation of MACLEAN'S MAGAZINE. Very much more can be said about its editorial policy and character, about its making, about its quest for and development of new contributors, about the policy that keeps canvassing methods and advertising columns clean, about the hearty approval of subscribers of MACLEAN'S MAGAZINE, about the significance of 50,000 circulation, about the wisdom of doing a "little advertising in a few magazines" as an initial step in national advertising plans; about the advertising of MACLEAN'S MAGAZINE in all the MacLean Publishing Company's list of business and technical newspapers, about the influence of MACLEAN'S MAGAZINE on distributors.

But time and space forbid here and now a continuation of the MACLEAN story.
What is enough to be impressed is—

MACLEAN'S MAGAZINE

Canada's National Magazine

143 University Ave., Toronto

Union Trust Bldg., WINNIPEG Boston New York Chicago London, Eng. Southam Bldg., MONTREAL

Side Partners

Your tools when they're right, when they're dependable, are real side partners always on the job ready for the biggest thing that comes along.

But this "side partner" quality must be built into them. It doesn't just happen. It means years of experience in tool making. It means right materials and right methods all the way through.

These are Pexto "reasons why": all these qualities are deeply embedded in the tools stamped with this name.

When you need a wrench for instance, one that is ever ready, dependable, strong and husky enough for the toughest kind of jobs, then ask your dealer for Pexto. Any one, or all three of these sturdy members of the Pexto Wrench Family will prove out as true side partners.

PEXTO SOLID HANDLE WRENCH

Like its husky brother this solid handle wrench is made of three strong, simplified parts with the addition of a heavy wooden riveted handle. With bars and jaws that stand the heaviest strain this wrench will come through with flying colors.

PEXTO SOLID STEEL WRENCH

Here's a husky member of the Pexto Family. It is made in only three parts, each part of special high quality steel forged so as to give weight and strength where most needed. The head, bar and handle are forged solid from one piece of steel.

PEXTO STILLSON WRENCH

They grip like a vise, these jaws of hardened steel, and there's no getting away. Quick response to a touch on the slide screw gives ready adjustment. They're Pexto-made right straight through. You can say these things and many more about this Stillson wrench and Pexto will back you up.

If your dealer doesn't carry Pexto tools, write us for the name of the nearest dealer who does. We'll make it easy for you to get Pexto Quality.

THE PECK, STOW & WILCOX COMPANY

Manufacturers Mechanics' Hand Tools, Linemens' and Sheet Metal Workers' Tools and Machine, Builders' and General Hardware

SOUTHINGTON, CONN. · CLEVELAND, OHIO

Address Correspondence to 205 W Center St., Southington, Conn.

PEXTO

PEXTO

MECHANICS' HAND TOOLS

If any advertisement interests you, tear it out now and place with letters to be answered.

Man-Size Conversation

Something about Jones---The Test Question that Silenced Jennings---Where Jones gets the information that makes him listened to when he speaks.

AFTER the little group had finished their cigars, and were about to separate, each going his own way, Brown said to Smith: "Wasn't Jones great? And didn't he put it all over Know-It-All Jennings?"

It was just such a group of men as you see gathered every day round a luncheon table, or in the club lounge; and the theme of the conversation was likewise common enough—the present business situation, and the probable situation when Peace is made.

At first every man had opinions to declare, but most of all Jennings. Jones was, at the beginning, the silent one. But at a point when Jennings, with his usual cocksureness, was voicing some extravagant views, Jones rather jolted him by asking him, "What is your authority?" And Jennings didn't have authority—nothing more than opinions.

It was then that Jones began to talk, and his tactful, well-informed views and statements instantly commanded the attention of every man round the table; for every man was learning. Even Jennings had the grace of keep quiet, for he knew he was listening to a better-informed man.

Jones has a staggering question to put to men with opinions which they express boldly and confidently. It is: "What is your authority? Your opinions are no better than your information." The average man expressing opinions doesn't possess much solid information; he just "feels" that way.

Every man not an idler is interested in Business—first, in his own business; second, in the Nation's business. Whether he be a retailer in a country town; or a manufacturer; or a lawyer advising clients on investments; or a bond-dealer needing to know much about the many factors that affect prices; or a banker; or a private investor whose funds, invested or waiting investments, are his main source of income; he is interested in Business, and he needs information—the real stuff which is the basis of opinion.

Where can each get the kind and amount of information desired?

Let him get it where Jones gets much of his information—from THE FINANCIAL POST OF CANADA.

Jones does a good deal more than just pay $3 to get this paper every Saturday; he *reads* it. To him the POST is the newspaper prized most of all. He sets aside a certain set time each week for reading it. It satisfies him because its views are based on information, and information is the POST'S chief material.

The POST keeps Jones soundly and broadly informed about the business affairs of the country. He finds that the POST takes a business-like view of all questions; that it is not influenced by any political factions or "interests," that it tells the truth whether the readers like it or not. He knows that little of importance will occur in connection with the business of the country without enlightening information or comment appearing in the POST.

He gets the best-informed news about listed and other securities, in the POST:—Milling, Transportation, Pulp and Paper, Iron and Steel, Electrical Enterprises; and so on. This weekly Security News he finds is of an authoritative character —usually signed—prepared by specialists, who, from the nature of their daily work, are in intimate touch with the factors that affect prices, and with high-up or well-informed men who have ***knowledge.***

Jones finds no other paper in Canada attempting to give the service the POST does in relation to listed securities.

Jones finds the POST'S editorial page stimulating. He enjoys the biographical stories of Big Men which appear in the POST. The article each week by Agnes Laut gives him information gathered by one of the best informed and highest paid writers in America. In short, for Jones the POST is a treasury of information about Business; and it is Business by which Jones earns his bread and butter and something more.

When Jones mingles with his fellow men, and Business is the Theme of Conversation, most men are willing to listen to him, because his opinions are based on sound and reliable information.

Now, what is the application of all this? It is that you, the reader of this advertisement, may also make yourself a well-informed man about *Business—by reading THE FINANCIAL POST.* The $3 it costs per year is neither here nor there to the man who really wants to *know*—to have knowledge about matters and markets pertaining to his own business; and about the Country's business.

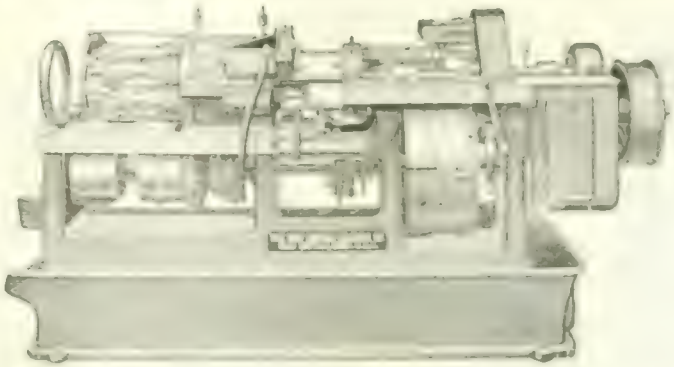
If you want your opinions to be well-informed; if you want a wide knowledge of Business; let the POST go to your home each Saturday. Sign the coupon below. Send no money now. Have the bill go forward in the usual way.

The Financial Post OF CANADA

The MacLean Publishing Co., Ltd.,
143-153 University Ave., Toronto.

Send me *The Financial Post,* for which I will pay $3.00 per year on receipt of invoice.

Name..... Address.....



Screw Machine Queries:

"IS REHANDLING NECESSARY?"

YES and no! The answer to this question depends upon the variety of operations required and the spindle capacity of your machine.

Pieces requiring drilling, tapping and similar operations on the "cut-off" end must, of course, be handled over—regardless of type of machine used.

On the other hand, there is much work that is commonly rehandled which could just as well be finished complete on the bar, were it possible to work the necessary number of tools without over complication.

In the "New Britain" Six-Spindle Automatic Screw Machine opportunity is afforded for the handling of those pieces whose variety of operations renders their production in a four-spindle machine impossible, or, if undertaken, necessitates the use of a complicated set-up, requiring excessive attention and liable to result in inaccurate work.

Particular attention is drawn to the fact that this additional capacity for performing end operations is not lost on work of a simpler character. In most cases advantage may be taken of the full spindle capacity of the machine by sub-division of the longer operations.

So that, while the work might have been accomplished with fewer spindles, its performance on a "New Britain" is attended by a considerable increase in production.

If you want an "all-around" screw machine, let your next installation be a "New Britain" Six-Spindle Automatic.

The New Britain Machine Company

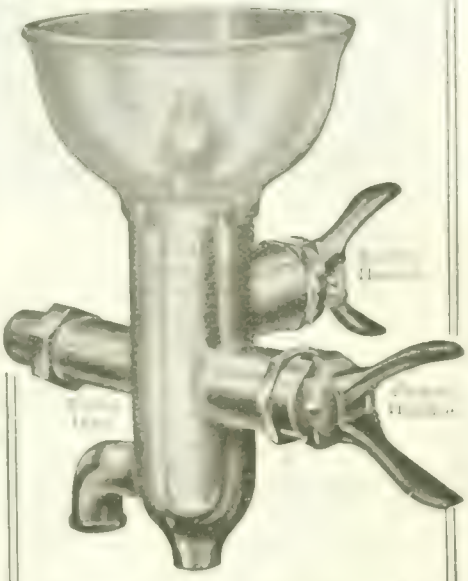
Automatic Screw and Chuck Machines

New Britain, Conn., U.S.A.

PURO

MADE IN CANADA

Saves Dollars



Puro Pays for Itself

"PURO-FY"

YOUR WATER SUPPLY

Puro Sanitary Drinking Fountain Company

147 University Ave., Toronto, Canada

OVENS

Enamelling and Varnishing Ovens heated by Gas, Electricity, Steam or Coal.

Write for booklet.

Brantford Oven & Rack Co., Ltd.

Brantford, Canada

MORTON MANUFACTURING CO.

PORTABLE PLANERS
DRAW CUT SHAPERS
SPECIAL DRAW CUT R R SHAPERS
FINISHED MACHINE KEYS
STATIONARY & PORTABLE KEY WAY CUTTERS
SPECIAL LOCOMOTIVE CYLINDER PLANERS

OFFICE AND WORKS: MUSKEGON HEIGHTS U.S.A.

'Barnes-Made'

Springs

are unusual in service and wear.

workmanship.

A trial will convince you that "Barnes-Made" Springs are the best buy.

Established 1857

THE WALLACE BARNES COMPANY

218 South St., Bristol, Ct., U.S.A.

Manufrs of "Barnes-made" Products

ON PAGE 68

You'll find a host of Opportunities.

TURN TO IT!

BERTRAMS LIMITED

Engineers

Sciennes, EDINBURGH

PAPER MILL MACHINERY

and

MACHINE TOOLS for IRON WORKERS

Catalogues offered to Purchasers.

Quality? Production? Spoilage?

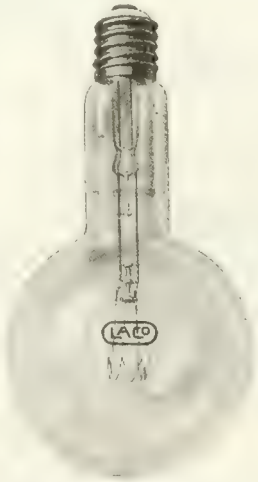
Are All Closely Related to the Lighting Efficiency of Your Shop

Poor or cheap light for your men is an exceedingly unprofitable "economy."

For late fall and winter afternoons and for the night shift, provide the equivalent of bright sunlight. Make it possible for your men to work with equal accuracy and efficiency, both during daylight and darkness.

Laco Nitro Lamp "The light that gives more light"

Puts the equivalent of bright, cheerful sunlight in your shop. It gives you twenty-four hours of daylight and its equal. It helps to maintain quality and production and eliminates much spoilage, due to insufficient light and inaccurate workmanship.



THE LACO NITRO LAMP is the latest development of the tungsten electric bulb. It is a tungsten filament suspended in a nitrogen gas-filled bulb. Less current, longer utility and more candle power per watt than any other type lamp.

Inquire from your nearest dealer.

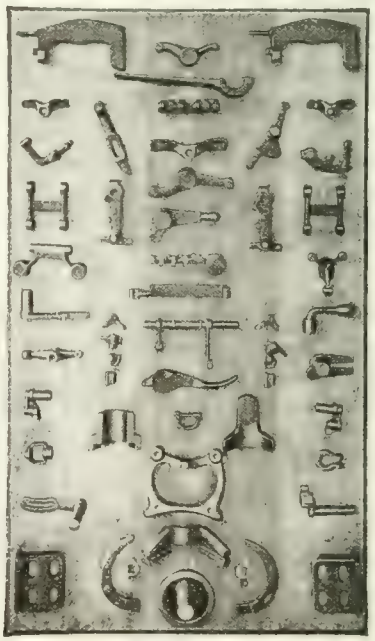
CANADIAN LACO-PHILIPS COMPANY, LIMITED

STOCKS AVAILABLE AT
MONTREAL, TORONTO, WINNIPEG, VANCOUVER

Witness a Drop-Forge Shop in action

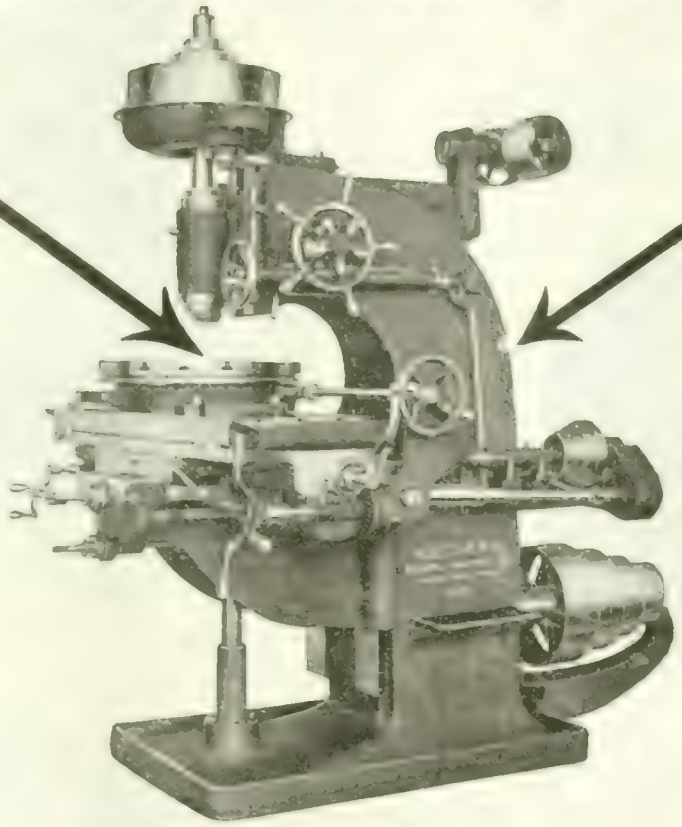
And you acquire a new idea of endurance

1,000 LB. DROP HAMMER
WHAT DROP FORGINGS ENDURE THERE EXPLAINS WHY SUPERIOR DROP FORGINGS ENDURE EVERYWHERE



J.H. WILLIAMS & CO.
THE WRENCH PEOPLE
45 RICHARDS STREET BROOKLYN, N.Y. CITY

Built For Your Needs



Fourteen Types, Twenty-four Sizes

If your requirements are such as are included in the range of these machines, you are one that can benefit most by Becker service. While it is true that each of our machines will make radical production increases, it is equally true that your special or peculiar work may have the same increase effected.

Becker service would be incomplete without a department that co-operates and helps to solve a client's peculiar and extraordinary needs.

We invite your inquiries. It will help us and at the same time may prove of inestimable value to you.

Becker Milling Machine Company

Hyde Park, Boston, Mass., U.S.A.

Agents:

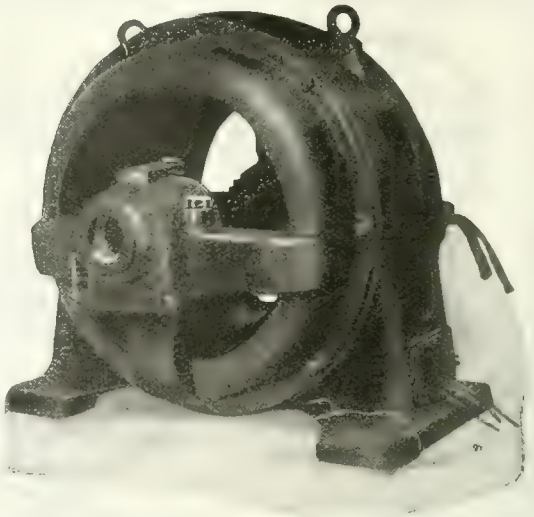
The A. R. Williams Machinery Company, Limited, Toronto and Hamilton

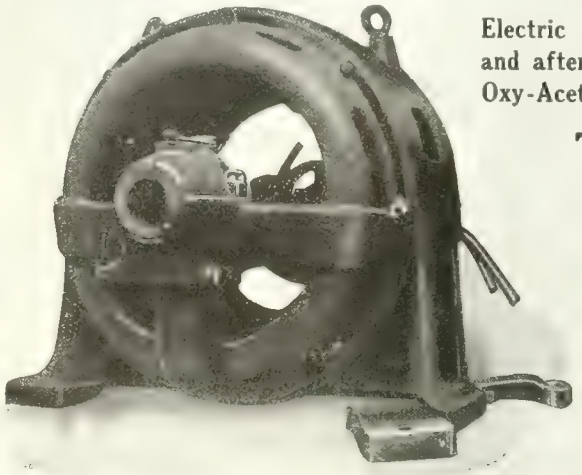
Williams & Wilson, Limited, Montreal, Que.

If any manufacturer wants one, that is not one who plays with letters to be answered.

Loss through Depreciation is Considerably Reduced by Oxy-Acetylene Welding

With a Welding Outfit at hand to constantly repair the minor breakages to machinery and equipment as they occur, the life of the equipment in a plant is prolonged indefinitely, and the loss by depreciation is appreciably reduced, in addition to the further advantage of obtaining a more efficient service from them whilst they are in use. The avoidance of loss of time when a "breakdown" occurs is alone sufficient to render the installation of an Oxy-Acetylene Outfit a profitable investment, and **"the bigger the break the greater the saving."**





Electric Motor before and after repairing by Oxy-Acetylene Welding

The cost of repairing this Motor was infinitesimal

and is representative of the constant and profitable uses that can be found for an Oxy-Acetylene Welding Outfit.

Why not investigate this to-day?

Attach this ad. to your letter head and mail to us. Full particulars as to how the Oxy-Acetylene Process can save YOU money, time and material will be sent by return, without obligation. We are in Canada in the best position to give you service, both practical and technical and there is no time like the present, **do it now.**

L'AIR LIQUIDE SOCIETY

Canadian Factories: TORONTO . MONTREAL WINNIPEG
HALIFAX (Under Construction)

COMMERCIAL ACETYLENE IS USED IN LARGEST SHIPBUILDING PLANTS

Illustration shows Commercial Acetylene cutting ship plates in one of the largest shipbuilding plants in Canada. We guarantee both quantity and quality of Commercial Acetylene. Write our nearest office about your supply.

MAIN OFFICE:
80 Broadway, New York

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BOSTON, MASS.
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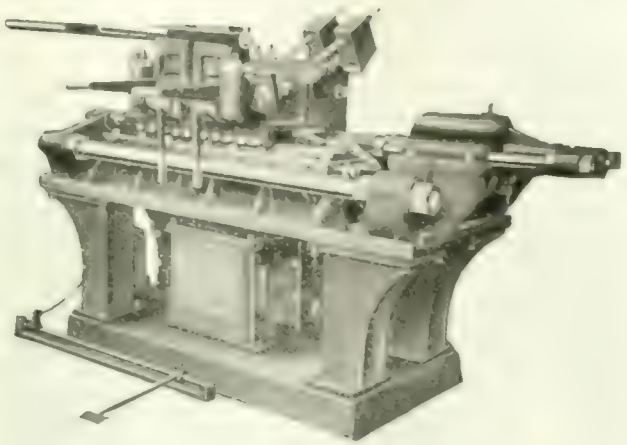
EAST DEERFIELD, MASS.
SAN FRANCISCO, CALIF.
MOBERLY, MO.
W. BERKELEY, CALIF.

COMMERCIAL ACETYLENE WELDING CO., INC.
103 BAY STREET, TORONTO

Thomson Process
Electric Welding



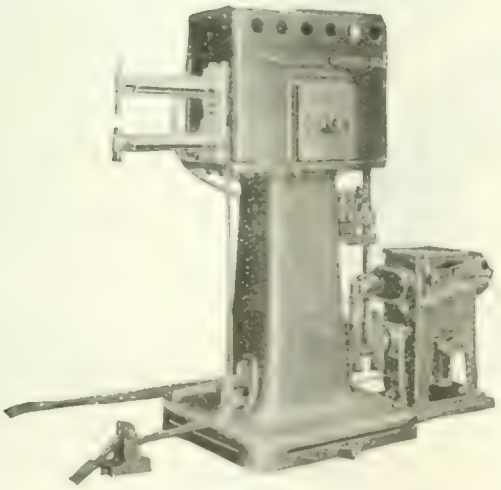
19 A-9
Butt Welding Machine

Waste!

The Thomson System of Electric Welding eliminates waste. Big manufacturers who allow so much for spoiled work each day will find it far cheaper to buy a Thomson Butt Welder. The saving in six months will more than pay for the initial cost.

For welding automobile rims, brake rods, angle irons, pipe joints or whatever your problem might be there is a style of Thomson Butt Welder that will do it more economically than you are getting it done now.

Send for Bulletin B-4



Combination Foot Operated and Six Speed Gear Box. Belt Driven.
Type 177

The Thomson Spot Welder makes more and better work possible

One firm writes, "One boy and a 'Thomson' can do more and better work than five men were able to do by the method we formerly used."

The Thomson Spot Welder is simple to operate. Just place the two pieces of metal to be welded between the copper die points—press the foot treadle and the pieces are united forever. No smoke, danger or dirt. No holes to punch. No rivets used.

There is a Thomson Spot Welder for your work. Let us have your requirements and we'll show you the machine.

Send for Bulletin S-4.

Thomson Electric Welding Co. Thomson Spot Welder Company
Lynn, Mass.

Canadian Sales Offices, 311 Falls Street, Niagara Falls, N.Y.

Thomson Process
Electric Welding

BRASS Castings

The coupling of expert work with unexcelled equipment enables us to produce on a large scale Brass Castings of any size or alloy.

Our prices, too, are most reasonable; for our large purchases direct from the smelters command their every price favor.

For better Brass Castings at a money saving, send your orders to us. We promise that our work will please you.

The St. Lawrence Welding Company, Ltd., Montreal, P.Q.

Manufacturers of Steel Tanks, Air Receivers, Welded Tanks, Etc. Electric Welders, Oxy-Acetylene Welders. Boiler Repairs. Lead Burning and Brass Foundry Work.

Office: 138 Inspector Street Works: 59 Olier Street Telephone: Office, Main 5779, Manager's Res., Westmount 3483

Stow Shell Grinders Increase Production

Suspended Pedestal Mounted on Truck

Any Size Any Current

Immediate Shipment

Stow Manufacturing Co.

Binghamton, New York, U.S.A.

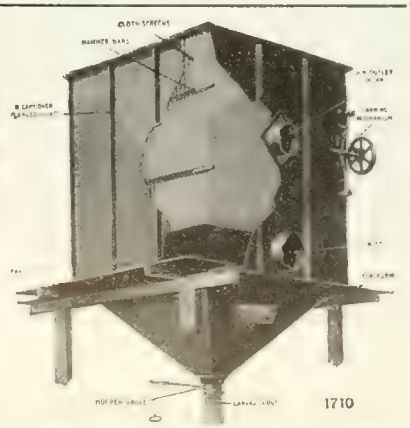
Oldest Portable Tool Manufacturers in America

H. E. W. Service

Our ability to serve is limited by the demands of your organization. Repair work, special marine repairs, machinery built. Our air chucks which are performing such efficient service in the shell industry is but an evidence of our ability. We have a large and complete staff of expert workmen and thorough equipment. Consult us. We will gladly co-operate with you.

Hyde Engineering Co.

27 William Street
Montreal, Que.



Healthy Air in Your Mill Room

is possible only by removing the dust. Our cloth-screen arrester retains all the fine vapor dust and passes cleaned air back into the room.

Write for catalog 120.

Complete Foundry Equipments

WHITING FOUNDRY EQUIPMENT CO HARVEY-ILL. U.S.A. CHICAGO SUBURB.

Cranes of all Types

Let Starrett Tests Pick Your Blade

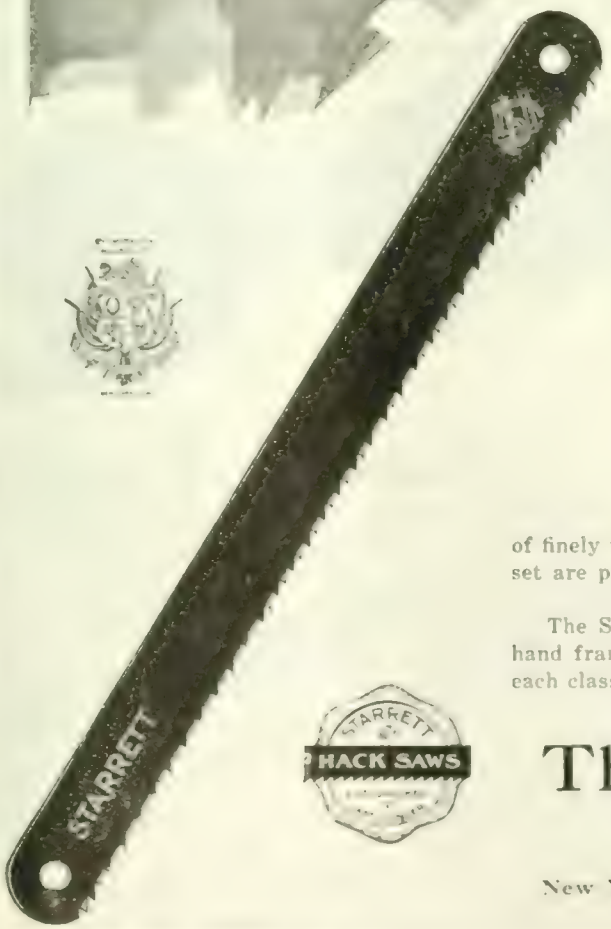
On brass rod or tool steel, sheets or girders, you can't be sure of the best work unless tests have come first. Tests are important. Tests prove that this or that blade is the blade to use.

Tests cost time and money. For that reason we have made the tests for you. We have spent much time in perfecting a hack saw blade for each class of work. That's why

Starrett Hack Saws

of finely tempered tungsten steel, with milled teeth having the proper set are preferred when good work and fast work are demanded.

The Starrett catalog, besides listing a full line of hack saws and hand frames, gives much valuable information on the best blade for each class of work. Drop us a post card asking for Catalog No. 213.



The L. S. Starrett Co.

The World's Greatest Toolmakers

ATHOL, MASS.

New York London Chicago

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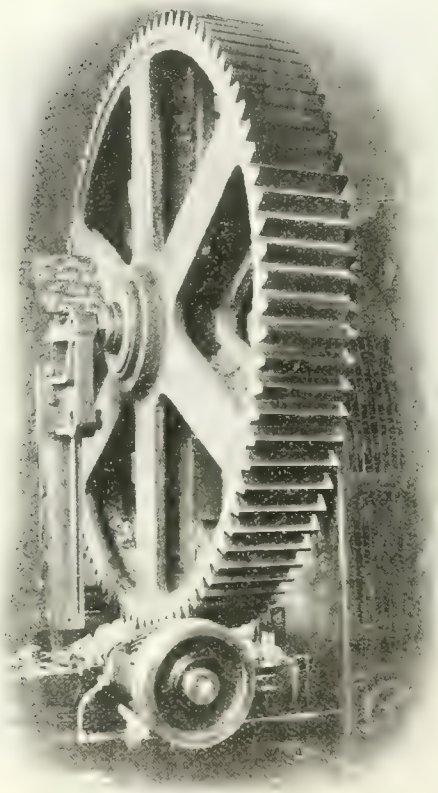
CUT GEARS

CUT GEARS



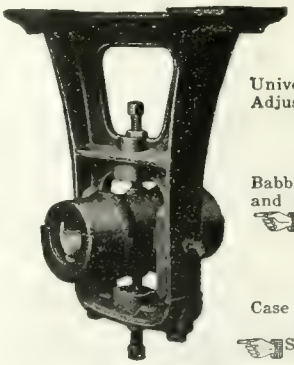
Heavy Steel Spur Gear
90" dia., 6,500 lbs.
88 T., 1 d.p., 12" F.

Write us for quotations.

Hamilton Gear & Machine Co.
Van Horne Street, TORONTO

A Giant for Work

An Infant for Oil



Universal Adjustment

Babbitted and Reamed Bearings

Case Hardened Steel Set Screws

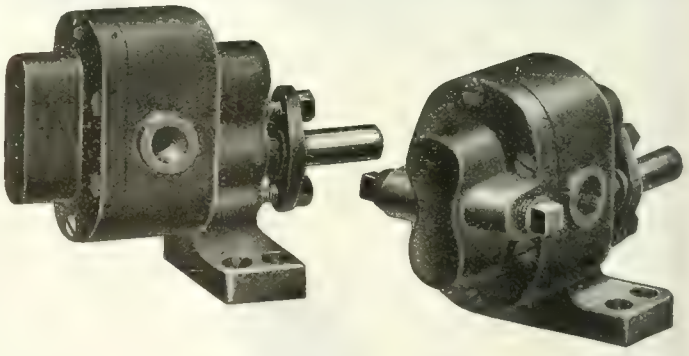
That describes the Bond as well as anything we know. Constructed of the finest materials, it will outlast any hanger on the market.

Made with the famous ring oiling system, the Bond gets positive lubrication without wasting a drop of oil.

Try a Bond—that's all we ask. The result—repeat orders—are reassured.

Get that Bond Book to-day.

CANADIAN BOND HANGER & COUPLING CO.
Limited
ALEXANDRIA ONTARIO



Circulating Pumps

Eliminate the separate relief valve and its necessary piping by installing the Roper Circulating Oil Pump. But, you say, why install a new system when the present is good enough? This "good enough" article may appear to be giving satisfaction, *but,* is it giving the best to be obtained. Can you speed up without any fear? With a Roper you need not have any fear of any kind. The oil flows from it in a steady, even stream, and there you can speed up to full capacity and let her go feeling confident.

Inquire. You will get valuable information anyway.

C. F. ROPER & CO.
Hopedale : Mass. : U.S.A.

CHAPMAN

DOUBLE BALL BEARINGS

Chapman Double Ball Bearings fit any adjustable hanger and the change can be made with but little delay to you.

Used in over 2,000 Canadian Factories. They have other good points too. Ask us to send full details

The ordinary line shafting consumes from 15 to 60 % of power developed—

But the line shafting that's equipped with Chapman Double Ball Bearing will save 75 per cent of the friction loads making an average total saving of power from 15 to 30 per cent.

The Chapman Double Ball Bearing Company of Canada, Ltd.
339-351 Sorauren Ave., TORONTO, Canada

TRANSMISSION BALL BEARING CO., Inc.
1050 Military Rd., Buffalo, N. Y.

DEPENDABILITY

Has Made

HARRIS HEAVY PRESSURE

THE MOST POPULAR BABBITT METAL IN THE DOMINION

Manufactured by

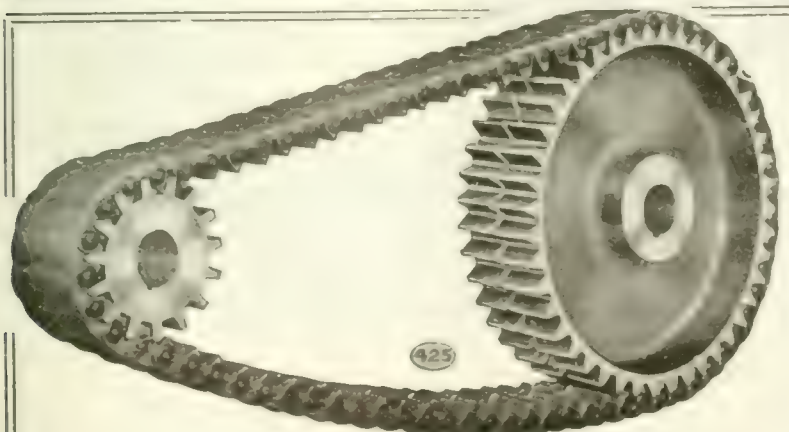
THE CANADA METAL CO., LTD.
Hamilton, Montreal, TORONTO, Winnipeg, Vancouver

IT FLOWS FREELY

IT WILL NOT CRACK

IT IS COPPER COATED

IT IS COPPER HARDENED



RENOLD CHAINS

The proven efficient form of Power Transmission.

PATENT SILENT

Chain and Parts Carried in Stock.

Sole Canadian Agents

Jones & Glassco. (Reg'd)

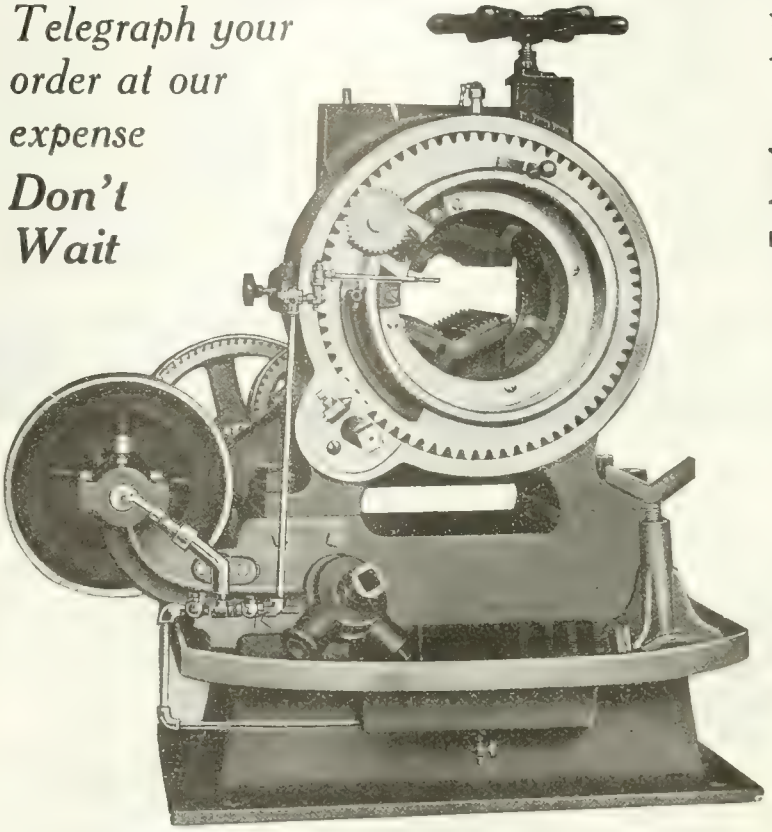
ENGINEERS

Branch Office: TORONTO, ONT.

St. Nicholas Bldg. MONTREAL, P.Q.

Telegraph your order at our expense

Don't Wait



In These WAR Times

If you have need of a

Pipe Cutting and Threading Machine

You want to know three things and in this order.

Delivery

All sizes up to 15", for either Hand, Belt or Electric drive, kept in stock for immediate shipment. No waiting.

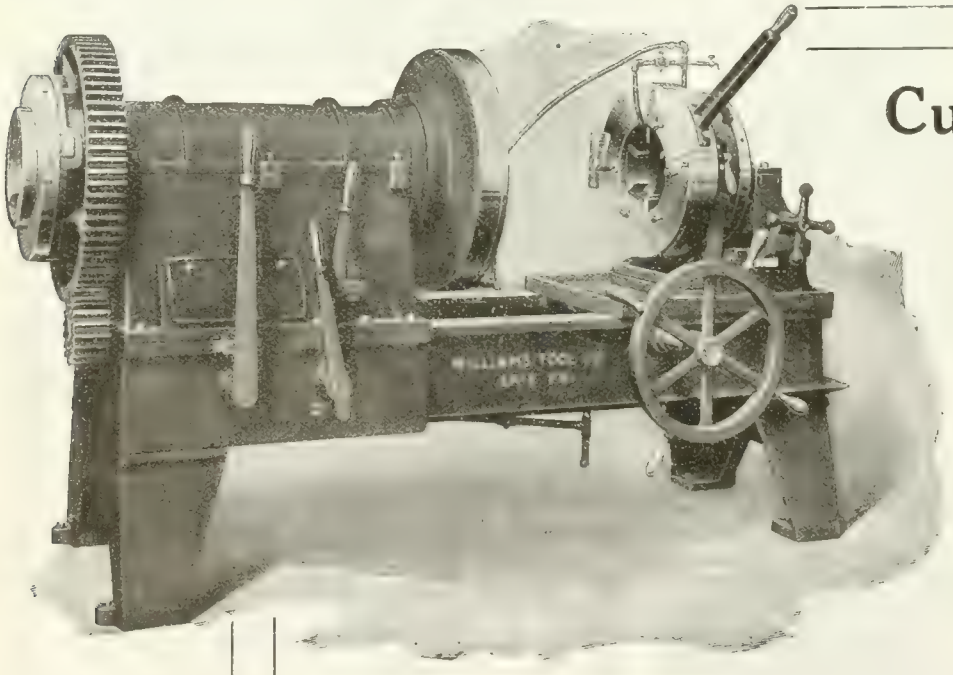
Quality

The original FORBES. Our specialty since 1882. More than 25,000 in use.

Price

Less than any other Standard Machine on the market, and less than half of many. Our system is the reason.

THE CURTIS & CURTIS CO., 115 Garden Street, Bridgeport, Conn.



Cutting-off and Threading

By the decree of expert judges Williams Cutting-off Machine has been declared the most **efficient.**

We have made this claim all along and this judgment only verifies it.

Made in 11 sizes and each size has a range of 8 to 10 consecutive sizes between ¼" and 18" diameter.

Write us about them. They will save you money, time, and increase the quality of your product.

Williams Tool Company

Erie, Penn., U.S.A.

Canadian Agents:
The A. R. Williams Machinery Co., Ltd., Toronto, Canada

European Agents:
Universal Machinery Corp. London, England

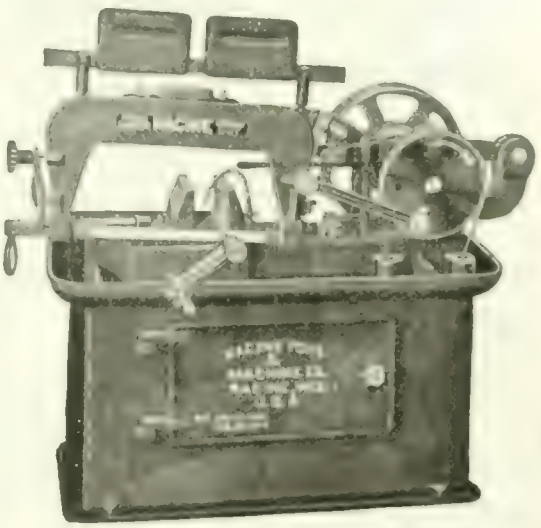
If what you need is not advertised consult our Buyers' Directory and write advertisers listed under proper heading.

This Racine

Cut 2500 Steel Bars With a Single Blade

The Racine patented return-stroke automatic-lifting device saves blades—saves time—saves *money*. Ample stock of the Famous Racine H.-S. Tungsten Blades is always at hand to protect users of Racine High-Speed Metal Cutting Machines.

ASK FOR OUR TRIAL OFFER TO PROVE OUR CLAIMS



RACINE TOOL & MACHINE COMPANY
15 MELBOURNE AVENUE, RACINE, WIS., U.S.A.

Safety Set Screws
Tap Extensions

Socket Head
Cap Screws

Safety Set Screws
Socket Wrenches

MANUFACTURED BY
135 Sheldon Street — The Allen Manufacturing Co. — Hartford, Conn.

HACK "STERLING" SAWS

MANUFACTURED BY
DIAMOND SAW & STAMPING WORKS -:- BUFFALO, N.Y., U.S.A.

If any advertisement interests you, tear it out now and place with letters to be answered.

You Don't Like to Shave with a Blunt Razor

—It tries your temper and spoils your skin.
Then don't expect your men to file with blunt files.
It makes *them grouchy* and spoils *your* work.
That costs *you* money any way you look at it.
Give your men "Famous Five" files to work with, and you'll get good results; because "Famous Five" files are hard, sharp and retain their keen cutting qualities for the longest time.
Remember this and specify them when ordering. They are:

Grinding Wheel Dressers

We are specialists in Grinding Wheel Dressers and can recommend the best types for any particular needs.

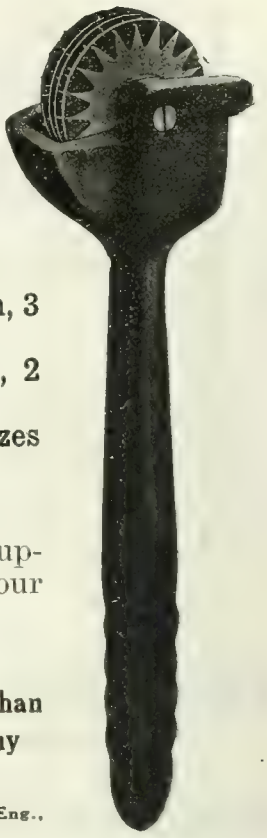
Our Dressers are:

Diamo-Carbo
Desmond Huntingdon, 3 sizes
Sherman Corrugated, 2 sizes
Norton Zig-Zag, 2 sizes
Magazine
Diamonds

We can promptly supply your needs from our stock.

The Canadian Desmond-Stephan Manufacturing Company
HAMILTON, ONTARIO

Alfred Herbert, Ltd., Coventry, Eng., Agent for Great Britain.



DOUBLE SAVINGS

in cutting on PEERLESS HIGH SPEEDMETAL SAWS; they save both Time and Material.

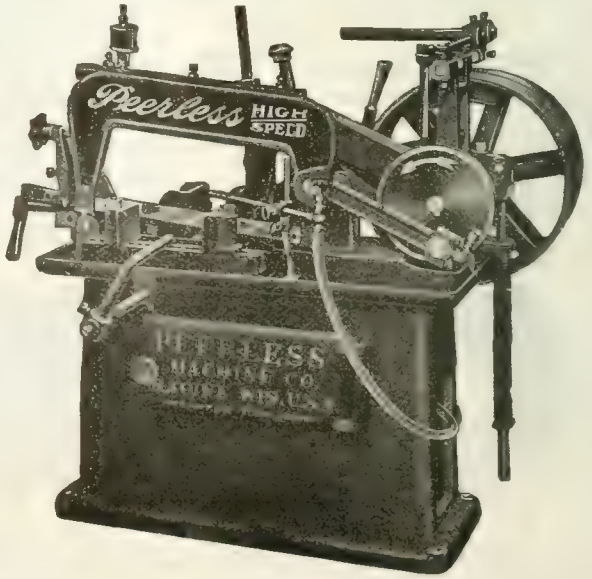
Supposing you save only 1/16 on each cut, 200 lbs. of material are saved on 100 cuts of 12 in. round. Your savings may be several times 1/16.

Have you ever stopped to consider the waste of material in wide cuts, especially at the present high cost, will pay for a PEERLESS in a remarkably short time.

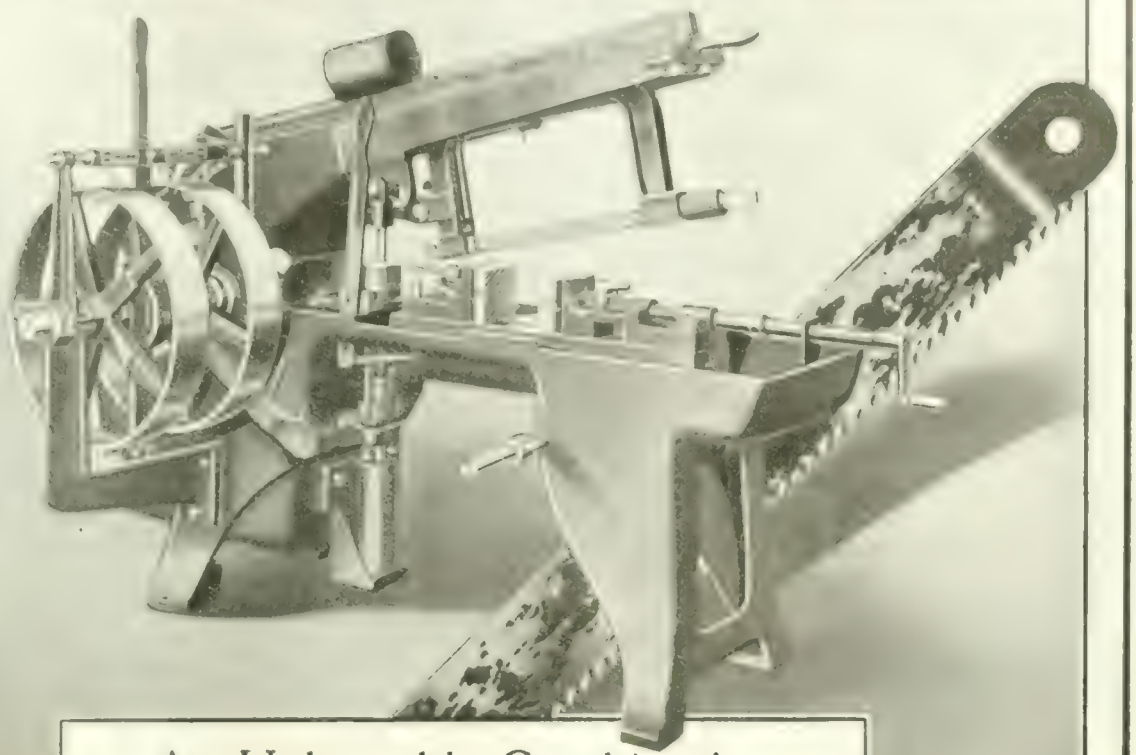
This is only one of the reasons for so many repeated orders and large concerns having standardized the PEERLESS. The many other reasons can only be fully appreciated after comparative test.

Write for a list of users; some of these machines may be working in your vicinity. A careful investigation always arouses enthusiasm.

PEERLESS MACHINE CO. 1607 Racine St. RACINE, WIS., U.S.A.



An Unbeatable Combination



An Unbeatable Combination

Are you a manufacturer of metal products, where accuracy, speed, production and economy count, and which require constant cutting-off of stock.

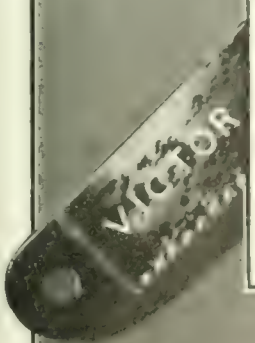
Here's The Combination You Are Looking For

The V. S. W. No. 5 High Speed Hack Saw Machine equipped with a VICTOR blade is unbeatable when it comes to increased production, and a minimum amount of power blade breakage and consumption.

Why?

An actual machine and blade operated by one of your own men in you own shop will be the most convincing demonstration we can make.

Let us send you one V. S. W machine on a thirty days' trial, with enough VICTOR blades to show you why.



VICTOR SAW WORKS LTD - HAMILTON, CANADA

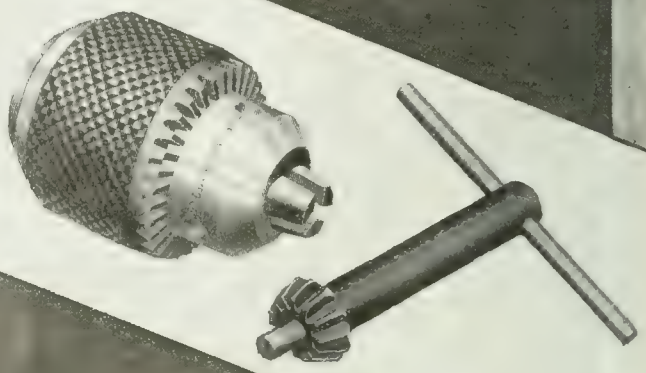
Jacobs
IMPROVED
Drill Chuck

A
Winner
By Sheer Merit

Jacobs Improved Drill Chucks are recognized as the STANDARD the world over. Once tried—always used.

Try them and see for yourself.

MADE BY
The Jacobs Manufacturing Co.
Hartford, Conn., U.S.A.

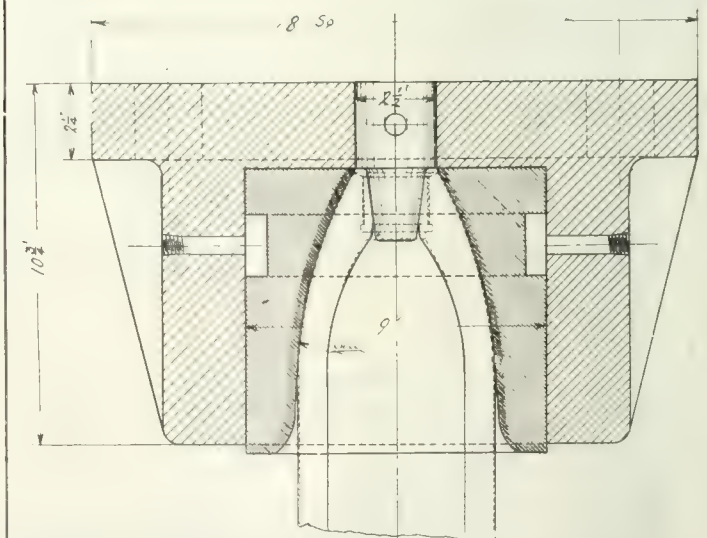


Why Are Over 50 Shell Factories

in Canada and the United States using our

Nosing Dies & Holders?

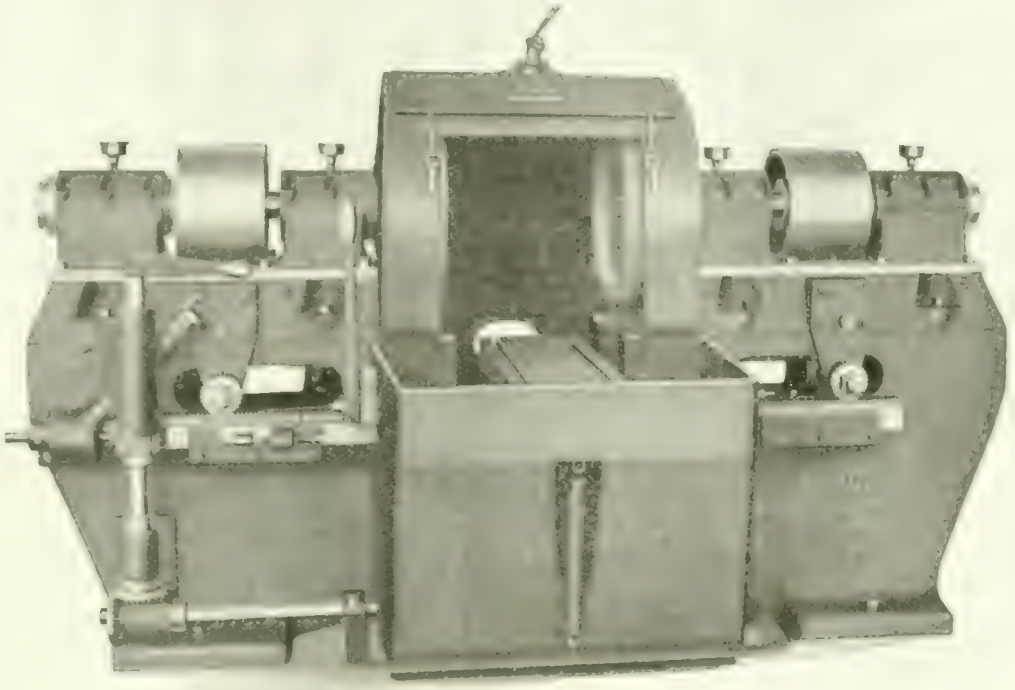
BECAUSE our experience of a quarter of a century in making Car Wheels, Crusher Jaws, etc., of special Chilling Iron Mixtures enables us to produce just the right mixture for each size of Die, consequently



Nosing Die-Holder and Die for 6-in. Mk. III H.E. Shells.

They are made right, and chilled to the right depth to give long life, without being too brittle. Nearly 2,000 have now been made to the satisfaction of the users. Are you one of them?

MARSH & HENTHORN, LIMITED
BELLEVILLE, ONTARIO



Solve Your Grinding Troubles

Possibly your trouble is that you are [illegible] with enough accuracy. Your grinding may not be up to the grade of efficiency desired. You have no doubt thought about that. Have you ever sought information or help from a firm who feature their organization by the service they render? If not, we would welcome your visiting us.

The No. 15 Double Spindle Grinder is but one of our great number of manufacture. It is specially adapted for builders of guns, ammunition and motor cars. It carries 24" disc wheels or 2" ring wheels. It has 8½" face pulleys, giving abundant driving capacity and all other dimensions are proportionately large and powerful. Both types of grinding wheels are interchangeable. Get in touch with us on any grinding problem. Give our Service Department a test.

GARDNER MACHINE COMPANY

Beloit, Wisconsin, U.S.A.

Canadian Sales Agents: **THE CANADIAN FAIRBANKS-MORSE COMPANY, LIMITED**

St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Saskatoon, Calgary, Vancouver, Victoria

Murchey

EQUALS 10 SOLID TAP LIVES

That point alone is sufficient to stamp Murchey adjustable taps as the undisputed leader of its class.

The point is this—when a chaser on a Murchey Tap is ground it can be adjusted to compensate for wear: with a solid tap this cannot be done with the fineness, the finish, the absolute accuracy that characterizes our adjustable taps. A solid tap will lose its accuracy, and the more grindings the greater the inaccuracy. We maintain a special chaser service for our clients.

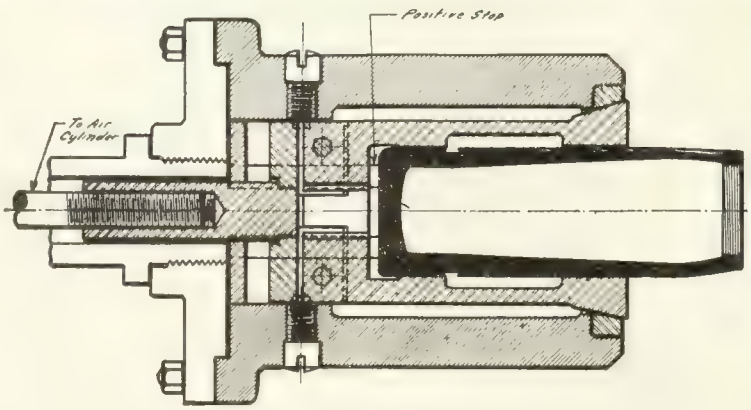
The Murchey Adjustable Tap has other features which we will gladly furnish upon request.

MURCHEY MACHINE & TOOL CO.

75 Porter St. Detroit, Mich.

The Coats Machine Tool Co., Ltd., Caxton House, Westminster, London, S.W., England
Fenwick Freres & Co. 16 Rue Fenelon Paris, France

EVERY MINUTE EVERY DAY PRODUCTION SPEEDED



M. E. C. THREE JAW HINGED COLLET CHUCKS

with steel body are almost everlasting. Not one complicated part to get out of order. Grip firm and positive, their simple air valve control greatly facilitates the quick insertion or withdrawal of work.

Instead of wasted minutes chucking with slow hand-operated chucks, do the same work in seconds, and do it better, with M. E. C. Three Jaw Chucks—compressed air operated.

M. E. C. Chucks
Air Operated

are 100% efficient wherever rapid manufacturing and absolute accuracy are the demands.

Know what great helps to speed production M. E. C. Chucks and Air Cylinders have proved themselves. Write to-day for our catalogue and 30-day free trial plan.

Manufacturers Equipment Company

175-179 North Jefferson St., CHICAGO, ILL.

CANADIAN AGENTS: J. R. Stone Tool and Supply Co., Detroit, Mich.
New York: J. R. Stone Tool and Supply Co., 30 Church St.

Air Operated Three-Jaw Universal Chuck

Hannifin Air Chucks

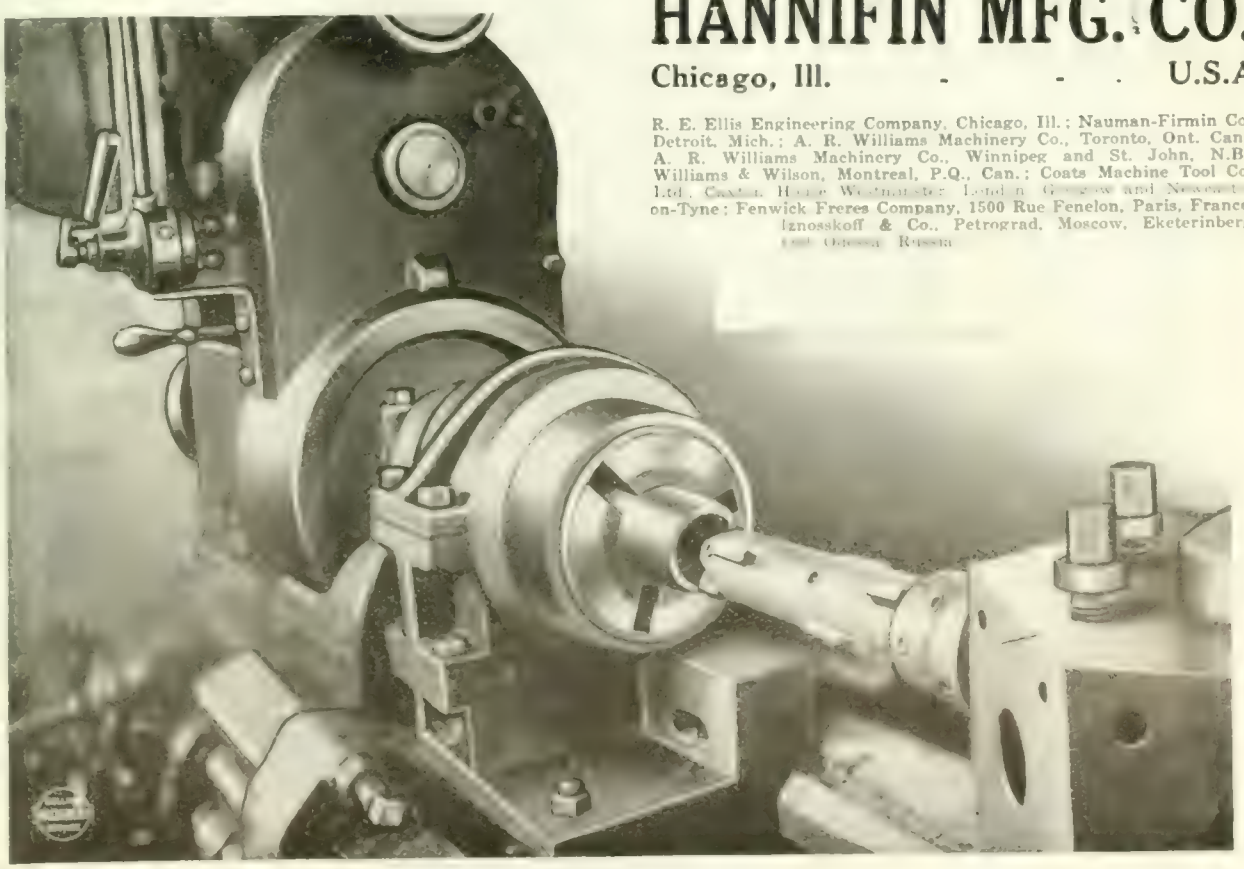
Air Operated Two-Jaw Universal Chuck

Increase Your Output 20 to 100 Per Cent.

This is a big claim, but it's nevertheless within the range of possibility in your plant. Other plants have increased their production 20 to 100 per cent.—you can do likewise. At the Worthington Pump and Machinery Corporation's Hazelton, Pa., plant, Hannifin Air Chucks are in sole possession of the field. They won this distinction through superior merit.

Cut below shows a 3" Russian shell *Hannifin chucked* for inside operation.

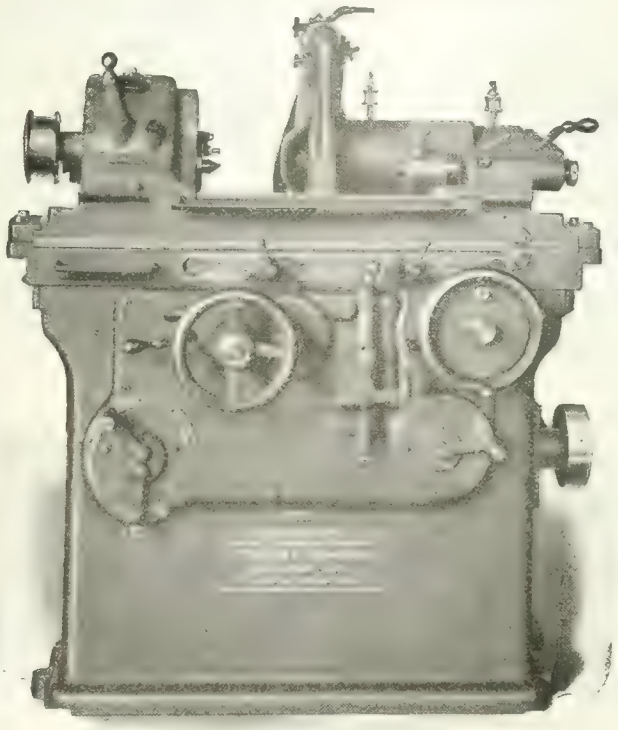
For quick handling and rigid slip grip work the "Hannifin" is the chuck for the job. Works on and under 75 pounds pressure.



HANNIFIN MFG. CO.

Chicago, Ill. - - - U.S.A

R. E. Ellis Engineering Company, Chicago, Ill.; Nauman-Firmin Co., Detroit, Mich.; A. R. Williams Machinery Co., Toronto, Ont. Can.; A. R. Williams Machinery Co., Winnipeg and St. John, N.B.; Williams & Wilson, Montreal, P.Q., Can.; Coats Machine Tool Co., Ltd., Caxton House Westminster, London, Glasgow and Newcastle-on-Tyne; Fenwick Freres Company, 1500 Rue Fenelon, Paris, France; Iznosskoff & Co., Petrograd, Moscow, Eketerinberg, and Odessa, Russia



MODEL "A"

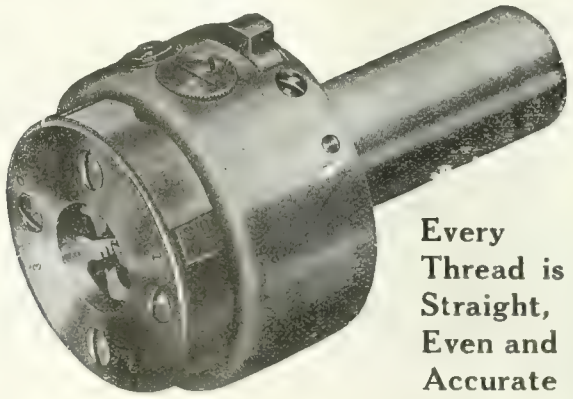
Fitchburg Grinders

Model "A" illustrated here is a machine whose chief feature is its capacity for size, variety and quality of work. Its speed will give you greater production; its size, convenience, increased production, strength and saving in floor space will effect such a saving as to make it preferable over all other machines of similar character.

It is specially adapted for grinding straight or taper shafts.

An inquiry would speedily get you valuable information and data.

Fitchburg Grinding Machine COMPANY
Fitchburg, Mass., U.S.A.



Every Thread is Straight, Even and Accurate

The Chasers in an *H & G Automatic, Self-Opening Die Head* are set and held in place by a steel cam. That cam once adjusted, locks; there is no stoppage or changing in size.

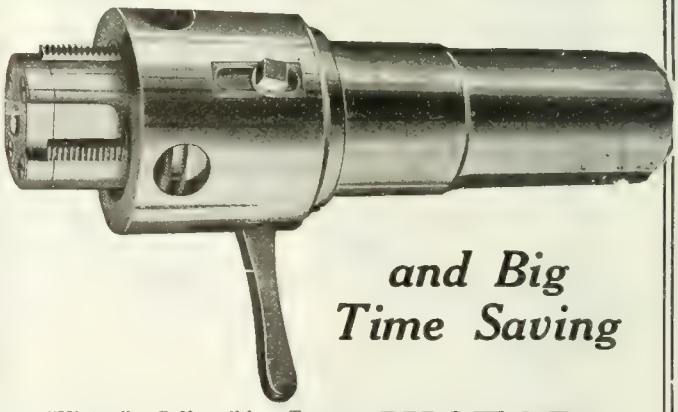
The quick release not only insures the cutting of the thread to a given point every time, but permits cutting right up to a shoulder when required.

Simple, Strong and Compact.

Our booklet tells more. ***Drop a card for it.***

Eastern Machine Screw Corp.
New Haven, Conn., U.S.A.

For Positive Accuracy—

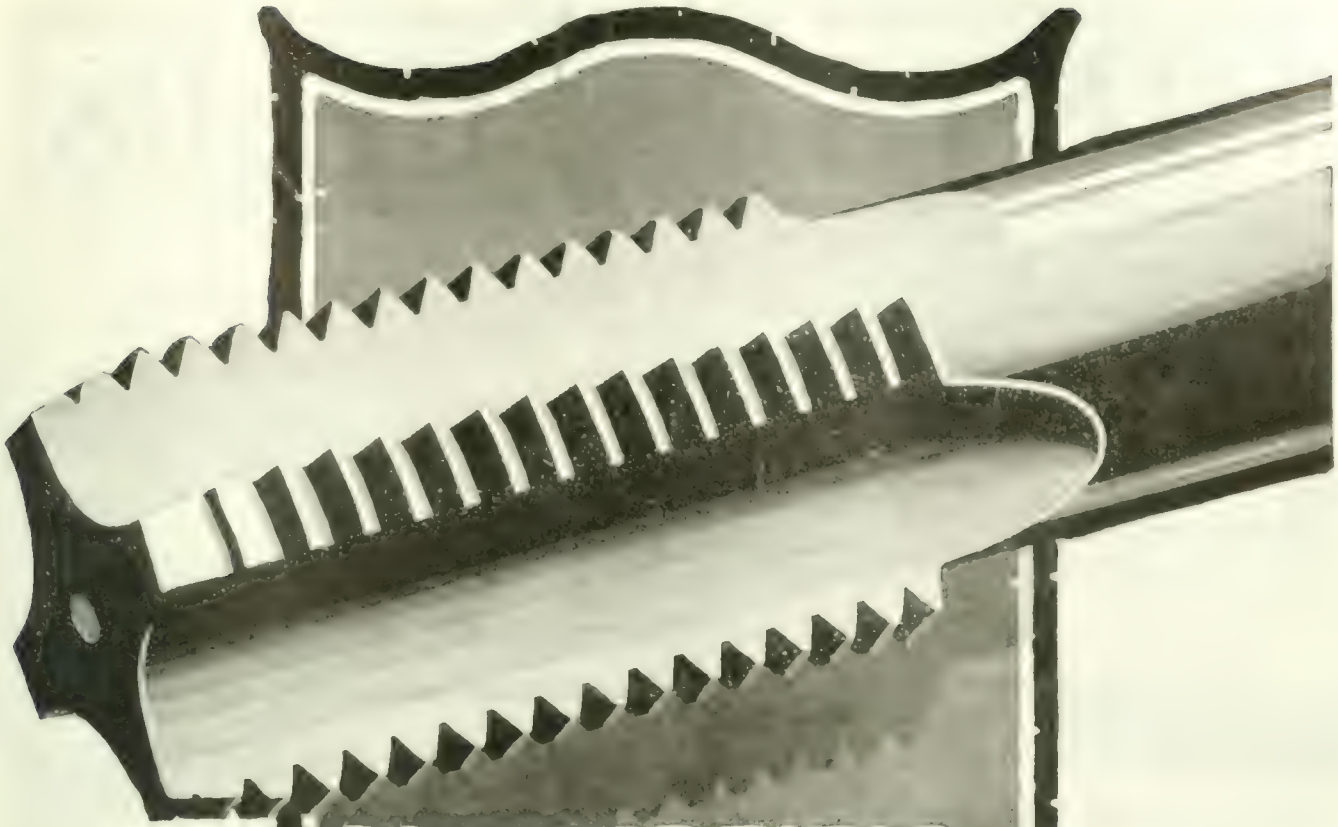


and Big Time Saving

"Victor" Collapsible Taps are simple in construction; the few parts can be made large and strong; the body is machine steel, and the chasers are high-speed; screw adjustment from front end makes it easy to maintain close accuracy; trip is automatic; reset by means of lever. The above features—and others—make the "Victor" a time and money saver for severe service. It is being used by many shell manufacturers.

VICTOR Collapsible TAPS

Victor Tool Company
Waynesboro, Pa., U.S.A.



BUTTERFIELD.

The name that means *quality* and *service*.

Butterfield Taps, Dies and Reamers are the finest development of many years' experience in tool making. Material design, workmanship—every detail is correct.

For the minimum of wear and breakage—Butterfield Tools.

Catalog No. 16 on request.

Butterfield & Company

Derby Line - Vermont, U. S. A.

[illegible]
Chicago—11 S. Clinton St.
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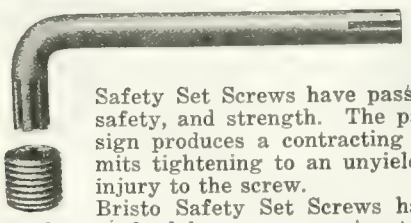
HINTS TO BUYERS

BUILDERS OF MACHINERY WHAT SET SCREWS DO YOU USE?



TRADE MARK
BRISTO
REG. U. S. PAT. OFF.

Safety Set Screws have passed every test for safety, and strength. The patented fluted design produces a contracting effect which permits tightening to an unyielding grip without injury to the screw.

Bristo Safety Set Screws have been adopted as the standard by many prominent machine builders. Ask for free samples and Bulletin I-809.

THE BRISTOL CO., Waterbury, Conn.
U. S. A.

THOUSANDS of Dollars are saved every year by our clients, because we have experts who are trained to make exhaustive tests of all the material you are purchasing, whether raw material or finished products.

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"THISTLE" BRAND RUBBER BELTING

"Maintenance of Quality"
is our motto, and our experience in the manufacture of belting since the year 1856 should be invaluable to you. Let us tell you all about this friction faced belting. The price will appeal to you.
Write to-day.

J. C. McLAREN BELTING CO., LTD.
TORONTO, MONTREAL, WINNIPEG

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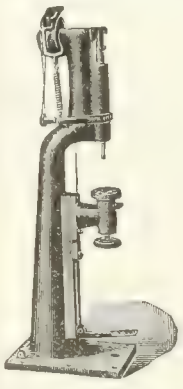
We are well equipped to make all kinds of steel castings, 100 lbs. to 50,000 lbs.

Dominion Steel Foundry Co.
Hamilton LIMITED Ontario



IS YOUR RIVETING PROFITABLY DONE?

Our Elastic Rotary Blow Riveting Machine does profitable work, because one machine will do the work of several hand riveters, and do it better.

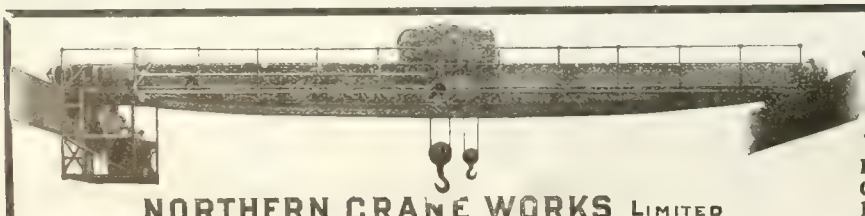
Every head is perfectly formed, any shape, round, flat, oval, rectangular, etc.

Catalogue C tells more about it.

The F. B. SHUSTER COMPANY
New Haven, Conn.
Formerly John Adt & Son. Established 1866.
Also makers of Wire Straighteners and Cutter, Cotter Pin Machines, etc.

RIVETED STEEL TANKS FOR EVERY PURPOSE

OIL STORAGE - GASOLINE TANKS - AIR RECEIVERS
PNEUMATIC WATER SUPPLY TANKS - SMOKE STACKS
BOILER BREECHING - RIVETED STEEL PIPE - BINS & HOPPERS



NORTHERN CRANE WORKS LIMITED
WALKERVILLE, ONTARIO

"MADE IN CANADA"
NORTHERN CRANES
Electric Traveling Cranes, Hand Cranes, Electric Hoists, Air Hoists, Foundry Equipment, Cupolas, Ladles, Etc., Etc.

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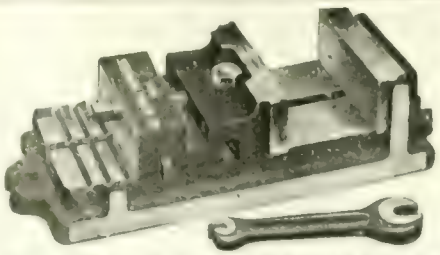
SKINNER DRILL PRESS VISE



Printed matter promptly mailed on request.

THE SKINNER CHUCK COMPANY

New York Office, 94 Reade Street — London Office, 149 Queen Victoria St — San Francisco Office, Rialto Bldg

Factory and Main Office, New Britain, Conn., U.S.A.

Keep Your Grinding Wheels True

End View

Francis & Co

Hartford, Conn.

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COAL COKE HACK SAW BLADES

CARBON STEEL MACHINERY STEEL

HIGH SPEED STEEL

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A universal grinder. A grinder with all attachments. A grinder that will handle all kinds of tool-sharpening as well cylindrical, internal and surface grinding. An all-around machine for your tool-room.

Catalog No. 6.

Greenfield Machine Co.

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Telegrams and Long Distance Telephone Messages are not uncommon among the replies to ads in our Classified Advertising Section.

For Hardness Testing

THE PYROSCOPE

in shop and laboratory use the

Standard Scleroscope

Universally adopted, time saving, inexpensive, and the only instrument that agrees with others in all parts of the world using systems of ordering their tools to specification.

BOOKLET FREE.

THE SCLEROSCOPE (Set)

Heat Indication

by optical means is fast becoming the correct thing. The PYROSCOPE has solved the problem. Perfect constancy, inexpensive, no electricity used. Built to stand rough usage and upon common sense lines. Used by the Government and best firms.

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Combined Jaw and Friction. Friction only Gas Engine Clutches. Jaw Clutches.

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Exclusive Canadian Agents:

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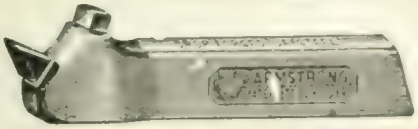
ARMSTRONG TOOL HOLDERS

Won The

GRAND PRIZE

THE HIGHEST POSSIBLE AWARD AT THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION.



THEY ALWAYS MAKE GOOD

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Armstrong Bros. Tool Co.

"The Tool Holder People"

306 N. Francisco Ave., CHICAGO, U.S.A.

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Cold Drawn, Turned and Polished Steel, Rounds, Squares, Hexagons and Flats, Steel Piston Rods, Pump Rods.

Special facilities for Keyseating up to 6 in. diameter.

THE

Canadian Drawn Steel Co.

HAMILTON Limited CANADA

If any advertisement interests you, tear it out now and place with letters to be answered.

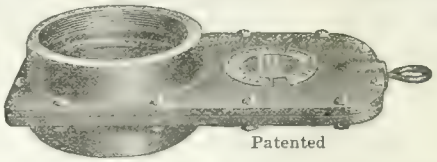
Metal Testing Instruments

The Brinell Meter
for determining the hardness of metals and metal products.

The Erichsen Machine
for testing metal sheets and strips.

WRITE FOR CATALOGUES
Herman A. Holz, 1 Madison Ave. N.Y.

NEW AIR-TIGHT BLAST GATE
FOR LOW AND MODERATE PRESSURE AIR



Patented

Save that air (money) you are now losing through leaky blast gates. Our NEW AIR TIGHT BLAST GATE stops this loss.
Circular 128 B explains its many other advantages, outlining clearly its all round superiority over the ordinary light, flimsy, cheap, leaky and unreliable blast gates and the heavy, cumbersome, expensive and sweating gate valves and stop cocks.
Ask for circular and list of users.

W. S. ROCKWELL COMPANY
FURNACE ENGINEERS AND CONTRACTORS
50 Church St. (Hudson Terminal Building) New York

NORTON JACKS
FOR ALL KINDS OF HEAVY LIFTING
Send for complete catalogue showing 50 styles 10 to 100 tons capacity.
Made only by **A. O. NORTON, Limited**
Coaticook, Prov. Quebec, Canada

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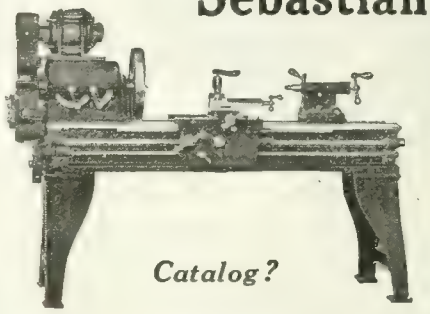

Catalog?

—The Standard, Medium - Priced Tool for over 30 years is offered in either Geared Head, Motor Drive, Cone Head, Quick Change or Plain Change Gear.
As a Money-Saving Tool you should investigate its merits before purchasing a lathe.

THE SEBASTIAN LATHE COMPANY
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Oxy-Acetylene Welding and Cutting Apparatus
OXY-ACETYLENE WELDING DAVIS APPARATUS DAVIS BOURNONVILLE CO. N.Y.
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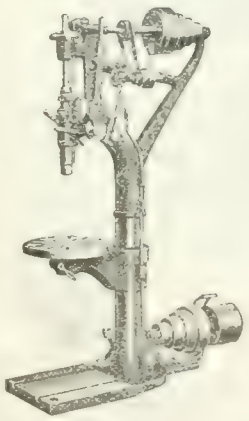
Sales Offices: New York, Boston, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, Detroit, St. Louis, San Francisco, Seattle.



20" Swing Drills in four distinct styles. Plain lever feed, lever and wheel feed, power feed and automatic stop, and with back gearing. Made singly or in 2, 3 or 4 spindle gangs. Write us for complete information and Catalogue No. 62; also for particulars on our new 25" Drilling Machine.

The Silver Mfg. Company
Box 290 Salem, Ohio

SILVER

FERALIUM THE ULTIMATE IN DIAMOND SETTING IT IS GUARANTEED

Finest Diamonds and Diamond Tools
THE GENERAL SUPPLY CO. of Canada, Limited
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Sole Canadian Agents for
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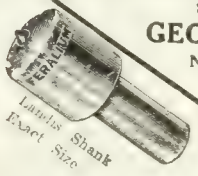
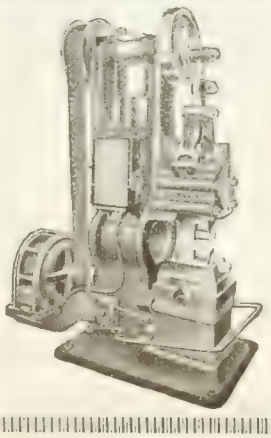


Our Ballas Diamonds Give Excellent Service



Fairbanks Hammers
25 to 300 lbs.
Belt or Motor Drive
These Hammers Embody a Design and Workmanship that are Unsurpassed.
Send for Catalog
UNITED HAMMER CO.
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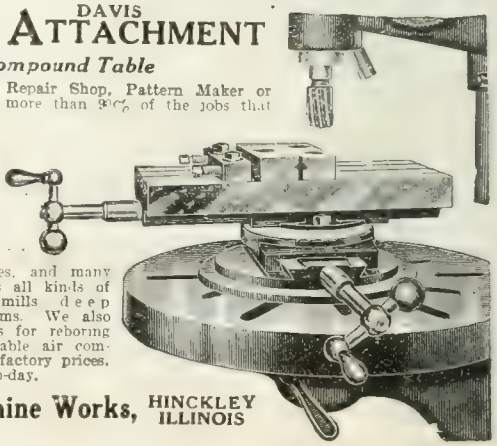
THE DAVIS MILLING ATTACHMENT
and Compound Table
For the Die Maker, Repair Shop, Pattern Maker or Garage, will perform more than 90% of the jobs that come up.



For any Drill Press 14" to 42" swing. Big Economy — Big Convenience— Small Price. It relieves your large millers, comes in handy spotting castings, milling ends of bosses, and many other odd jobs. Cuts all kinds of keyseats perfectly; mills deep grooves, slots and cams. We also make cylinder reamers for reboring Ford car, and a reliable air compressor—all at special factory prices. Write for circulars to-day.

Hinckley Machine Works, HINCKLEY ILLINOIS

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TOOL CASES

Something New, Different and Better

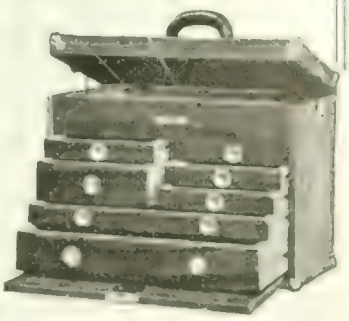
most cases of other manufac-

IRA EMBREE, Hamilton, Canada

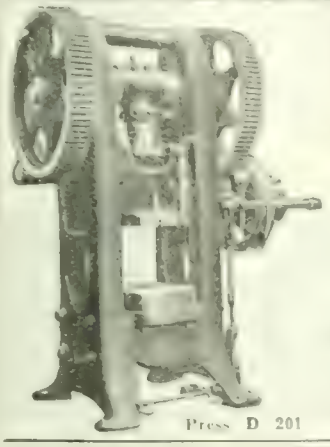
Save Money, Time and Worry

Get a

UNION TOOL CHEST



Union Tool Chest Works
28 Railroad St. Rochester N.Y.



PRESSES

FOR

CUTTING
FORMING
DRAWING
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Cuts Off In Half The Time

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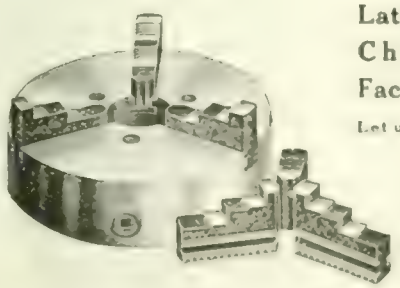

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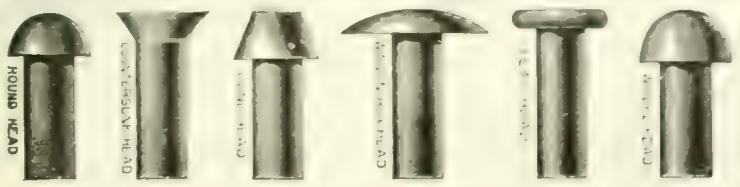

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The popularity of "Frost King" is due to its efficiency and extraordinary performance under heavy duty and the way it takes care of high speed.

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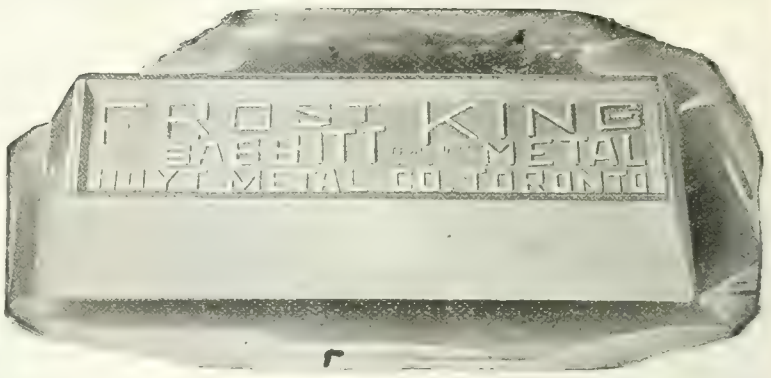

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New York, N.Y. London, Eng. St. Louis, Mo.

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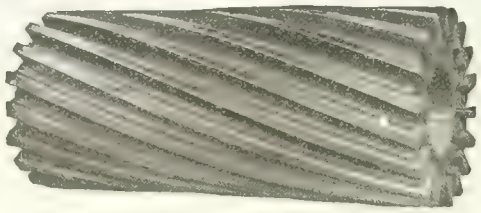

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They cut straighter.
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Can be worn over other glasses

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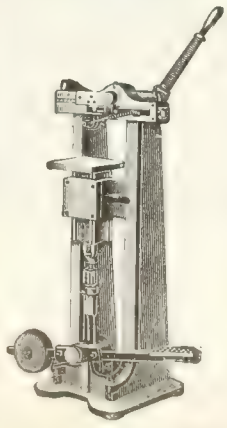

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Canadian Machinery BUYERS DIRECTORY

If what you want is not here, write us, and we will tell you where to get it. Let us suggest that you consult also the advertisers' index facing the inside back cover, after having secured advertisers' names from this directory. The information you desire may be found in the advertising pages. This department is maintained for the benefit and convenience of our readers. The insertion of our advertisers' names under proper headings is gladly undertaken, but does not become part of an advertising contract.

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Aikenhead Hardware Co., Toronto, Ont.
Baxter Co., Ltd., J. R., Montreal, Que.
Canadian Fairbanks-Morse Co., Montreal
Can. B. K. Morton, Montreal, Que.
Carborundum Co., Niagara Falls, N.Y.
Foss & Hill Machy. Co., Montreal
Frost-Smith Mach. Co., Hamilton, Ont.
Gardner Machine Co., Beloit, Wis.
Norton Co., Worcester, Mass.
Petrie, Ltd., H. W., Toronto, Ont.

ACETYLENE

Carter Welding Co., Toronto, Ont.
Commercial Acetylene Welding Co., Ltd., Toronto
L'Air Liquide Society, Montreal, Toronto
Prest-O-Lite Co., Inc., Toronto, Ont.

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Commercial Acetylene Welding Co., Ltd., Toronto
L'Air Liquide Society, Montreal, Toronto
Prest-O-Lite Co., Inc., Toronto, Ont.

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Charles F. Elmes Eng. Works, Chicago
Garlock-Walker Machinery Co., Toronto, Ont.
Niles-Bement-Pond Co., New York
Smart-Turner Mach. Co., Hamilton, Ont.
William R. Perrin, Ltd., Toronto

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The Jenckes Mach. Co., Ltd., Sherbrooke, Que.
MacKinnon, Holmes Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.

AIR WASHERS

Can. Blower & Forge Co., Kitchener, Ont.
Sheldons, Ltd., Galt, Ont.
Sturtevant Co., B. F., Galt, Ont.

ALUMINUM

Canada Metal Co., Toronto
Tallman Brass & Metal Co., Hamilton

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H. A. Ivory Co., Ltd., Montreal
Hawkridge Bros. Co., Boston, Mass.
Osborn (Canada) Ltd., Sam'l., Montreal, Que.
Standard Alloys Company, Pittsburgh, Pa.
Vanadium Alloys Steel Co., Pittsburg, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.

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Cleveland Twist Drill Co., Cleveland
Garlock-Walker Machinery Co., Toronto, Ont.
Morse Twist Drill & Mach. Co., New Bedford, Mass
Petrie, Ltd., H. W., Toronto, Ont.
Pratt & Whitney Co., Hartford, Conn.

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Carter Welding Co., Toronto, Ont.
L'Air Liquide Society, Montreal, Toronto
Prest-O-Lite Co., Inc., Toronto, Ont.
St. Lawrence Welding Co., Montreal, Que.

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Gardner Machine Co., Beloit, Wis.
Gardner, Robt. & Son, Montreal
McClean & Sons, F. W., Niagara Falls, Ont.
Riverside Machinery Depot, Detroit, Mich.
Petrie, Ltd., H. W., Toronto, Ont.
Pratt & Whitney Co., Hartford, Conn.
Rockford Machine & Tool Co., Rockford, Ill.
A. R. Williams Machy. Co., Toronto

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Aikenhead Hardware Co., Toronto, Ont.
Canada Metal Co., Toronto
Can. B. K. Morton, Toronto, Montreal
Foss & Hill Machy. Co., Montreal
Hoyt Metal Co., Toronto
Magnolia Metal Co., Montreal
Petrie, Ltd., H. W., Toronto, Ont.
Tallman Brass & Metal Co., Hamilton
Williams & Wilson, Montreal, Que.

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Canadian Fairbanks-Morse Co., Montreal
Can. S.K.F. Co., Toronto, Ont.
Chapman Double Ball Bearing Co., Toronto

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Cleveland Wire Spring Co., Cleveland

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Victoria Foundry Co., Ottawa, Ont.

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Morgan Engr. Mfg. Co., Toronto, Ont.
Niles-Bement-Pond Co., New York

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Clipper Belt Lacer Co., Grand Rapids, Mich.

BELT DRESSING AND CEMENT

Baxter Co., Ltd., J. R., Montreal, Que.

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Foss & Hill Machy. Co., Montreal
Graton & Knight Mfg. Co., Worcester, Mass.

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Can. B. K. Morton, Toronto, Montreal
Federal Engineering Co., Toronto, Ont.

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Canadian Fairbanks-Morse Co., Montreal
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Morse Chain Co., Ithaca, N.Y.
Petrie, Ltd., H. W., Toronto, Ont.
Whitney Mfg. Co., Hartford, Conn.

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Graton & Knight Mfg. Co., Worcester, Mass.
Goldie, Ltd. & Ritchie Co., Toronto, Ont.
McLaren, J. C., Belting Co., Montreal, Que.
Morse Chain Co., Ithaca, N.Y.
Petrie, Ltd., H. W., Toronto, Ont.
Standard Machy. & Supplies, Ltd., Montreal, Que.

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Bennett, W. P., 51 Montford St., Montreal, Que.
Dominion Belting Co., Hamilton, Ont.
Federal Engineering Co., Toronto, Ont.
Petrie, Ltd., H. W., Toronto, Ont.

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New Britain Mach. Co., New Britain, Conn.

BENCH DRAWERS, FRICTIONLESS

New Britain Mach. Co., New Britain, Conn.

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Bertrams, Limited, Edinburgh, Scotland
Brown-Boggs Co., Ltd., Hamilton, Can.
Can. Blower & Forge Co., Kitchener, Canada
Ferracute Mach. Co., Bridgeton, N.J.
Garlock-Walker Machinery Co., Toronto, Ont.
Charles F. Elmes Eng. Works, Chicago
Jardine, A. B., & Co., Hespeler, Ont.
National Machinery Co., Tiffin, Ohio.
Niles-Bement-Pond Co., New York
Petrie, Ltd., H. W., Toronto, Ont.
Steel Equipment Products Co., Owen Sound, Ont.
Toledo Machine & Tool Co., Toledo, Ohio

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Morgan & Co., Ltd., H. P., Toronto, Ont.

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MacKinnon, Holmes Co., Sherbrooke
Toronto Structural Steel Co., Toronto, Ont.

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Canada Foundry Co., Toronto, Ont.

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Canada Foundry Co., Toronto, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, Ltd., H. W., Toronto, Ont.
Sheldons, Ltd., Galt, Ont.
Sturtevant Co., B. F., Galt, Ont.
Toronto Blower Co., Toronto, Ont.

BLOW PIPES AND REGULATORS

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Can. Blower & Forge Co., Kitchener, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
Petrie, Ltd., H. W., Toronto, Ont.
Sheldons, Ltd., Galt, Ont.
Sturtevant Co., B. F., Galt, Ont.
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Syracuse Blue Print Co., Syracuse, N.Y.

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Skinner & Co., Hartford, Conn.
Wm. A. Tuke Co., Ltd., New York, N.Y.

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MacKinnon, Holmes Co., Sherbrooke
Petrie, Ltd., H. W., Toronto, Ont.
Riverside Machinery Depot, Detroit, Mich.

BOLT CUTTERS AND NUT TAPERS

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Canada Machinery Corp., Galt, Ont.
Landis Machine Co., Waynesboro, Pa.
Wells Brothers Co. of Canada, Galt, Ont.

BOLTS

Aikenhead Hardware Co., Toronto, Ont.
Cumming & Son, J. W., New Glasgow, Canada
Galt Machine Screw Co., Galt, Ont.
London Bolt & Hinge Works, London, Ont.
Steel Co. of Canada, Ltd., Hamilton, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
Gardner & Son, Robt., Montreal
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.
Petrie, Ltd., H. W., Toronto, Ont.
Riverside Machinery Depot, Detroit, Mich.
A. R. Williams Machinery Co., Toronto

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Victor Tool Co., Waynesboro, Pa.

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Petrie, Ltd., H. W., Toronto, Ont.
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Riverside Machinery Depot, Detroit, Mich.
Stow Mfg. Co., Binghampton, N.Y.

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Garlock-Walker Machinery Co., Toronto, Ont.
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Canada Machinery Corp., Galt, Ont.

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Oven Equipment & Mfg. Co., New Haven, Conn.

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BURRS, IRON AND COPPER
Parmenter & Bulloch Co., Gananoque.

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Ferracute Mach. Co., Bridgeton, N.J.
Brown, Boggs & Co., Hamilton, Can.
Prest-O-Lite Co., Inc., Toronto, Ont.

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Cumming & Son, J. W., New Glasgow, Canada.
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Marsh & Henthorn, Belleville, Ont.
Sheldons, Limited, Galt, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

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Dillon Mfg. Co., Oshawa, Ont.

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Bliss Co., E. W., Brooklyn, N.Y.
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The Jenckes Mach. Co., Ltd., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.
Tallman Brass & Metal Co., Hamilton.

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Hull Iron & Steel Foundries, Ltd., Hull, Quebec.
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Wm. Kennedy & Sons, Ltd., Owen Sound.
Plessisville Foundry Co., Plessisville, Que.
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Hull Iron & Steel Foundries, Ltd., Hull, Quebec.
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Cumming & Son, J. W., New Glasgow, Canada.

CASTINGS, NICKEL STEEL
Hull Iron & Steel Foundries, Ltd., Hull, Que.

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Pratt & Whitney Co., Dundas, Ont.
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Ford Chain Block & Mfg. Co., Philadelphia, Pa.
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Garlock Walker Machy. Co., Toronto, Ont.
Petrie, Ltd., H. W., Toronto, Ont.
Wright Mfg. Co., Lisbon, Ohio.

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The Jenckes Mach. Co., Ltd., Sherbrooke, Que.
Toronto Testing Laboratory, Ltd., Toronto.

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Union Tool Chest Works, Rochester, N.Y.

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Hannifin Mfg. Co., Chicago, Ill.

CHUCKS, AIR
Hannifin Mfg. Co., Chicago, Ill.
Manufacturers Equipment Co., Chicago, Ill.

CHUCKS, COLLET
Hannifin Mfg. Co., Chicago, Ill.
Manufacturers Equipment Co., Chicago, Ill.

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Foss & Hill Machy. Co., Montreal.
Gardner, Robt., & Son, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
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Ker & Goodwin, Brantford.
Manufacturers Equipment Co., Chicago, Ill.
Modern Tool Co., Erie, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Petrie, Ltd., H. W., Toronto, Ont.
Skinner Chuck Co., New Britain, Conn.
D. E. Whiton Machine Co., New London, Conn.

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Aikenhead Hardware Co., Toronto, Ont.
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Whitney Mfg. Co., Hartford, Conn.

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Victor Tool Co., Waynesboro, Pa.
Wells Bros. Co. of Canada, Galt, Ont.

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Rivett Lathe & Grinder Co., Brighton, Mass.

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New Britain Machine Co., New Britain, Conn.
Niles-Bement-Pond Co., New York.
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Hardinge Bros., Inc., Chicago, Ill.

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Johnson Machine Co., Carlyle, Manchester, Conn.
Positive Clutch & Pulley Works, Ltd., Toronto.

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Northern Crane Works, Ltd., Walkerville, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

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Sleeper & Hartley, Inc., Worcester, Mass.

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Hanna & Co., M. A., Cleveland, O.
Zenith Steel & Coal Products, Montreal, Que.

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Sheldons, Limited, Galt, Ont.
Sturtevant Co., B. F., Galt, Ont.

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Hannifin Mfg. Co., Chicago, Ill.
Hardinge Bros., Inc., Chicago, Ill.
Manufacturers' Equipment Co., Chicago, Ill.
Rivett Lathe & Grinder Co., Boston, Mass.

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Hinckley Machine Co., Hinckley, Ill.
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Petrie, Ltd., H. W., Toronto, Ont.
Riverside Machinery Depot, Detroit, Mich.
Smart-Turner Machine Co., Hamilton, Ont.
Taylor Instrument Co., Rochester, N.Y.

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A. R. Williams Machy. Co., Toronto.

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John Bertram & Sons Co., Dundas.
Niles-Bement-Pond Co., New York.

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Clark Equipment Co., Buchanan, Mich.
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.

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Baird Machine Co., Bridgeport, Conn.
Foster Machine Co., Elkhart, Ind.
Stow Mfg. Co., Binghampton, N.Y.

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Bernard Industrial Co., The A., Fortierville, Que.

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Can. Bond Hanger & Cplg. Co., Alexandria, Ont.
Cleveland Pneumatic Tool Co. of Canada, Toronto.
Gardner, Robt., & Son, Montreal.
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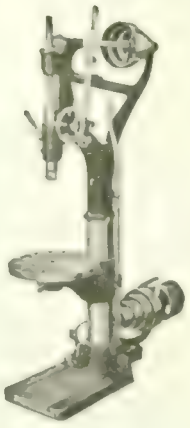

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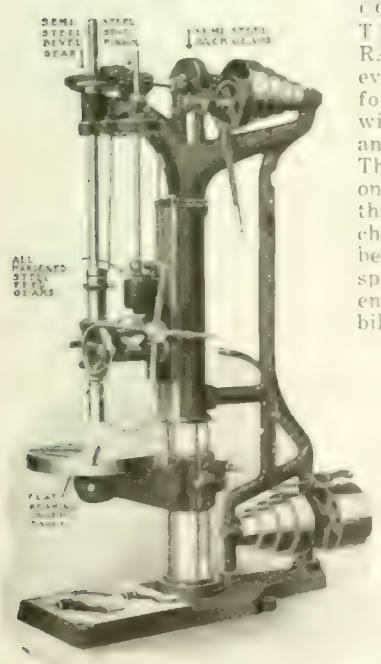

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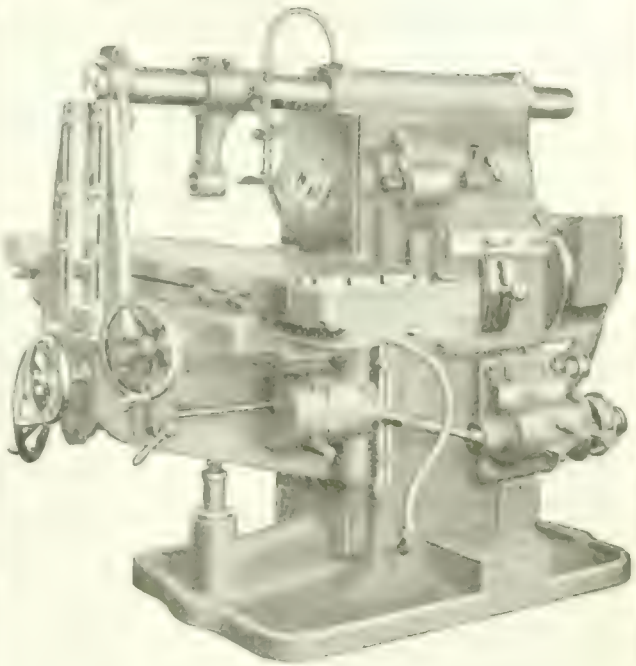

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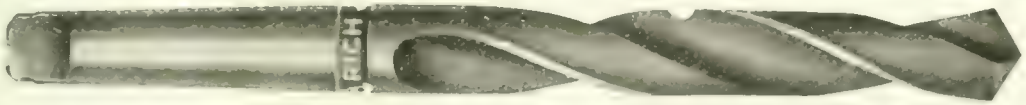

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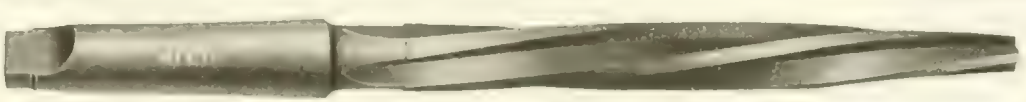

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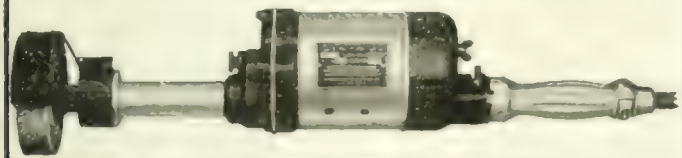

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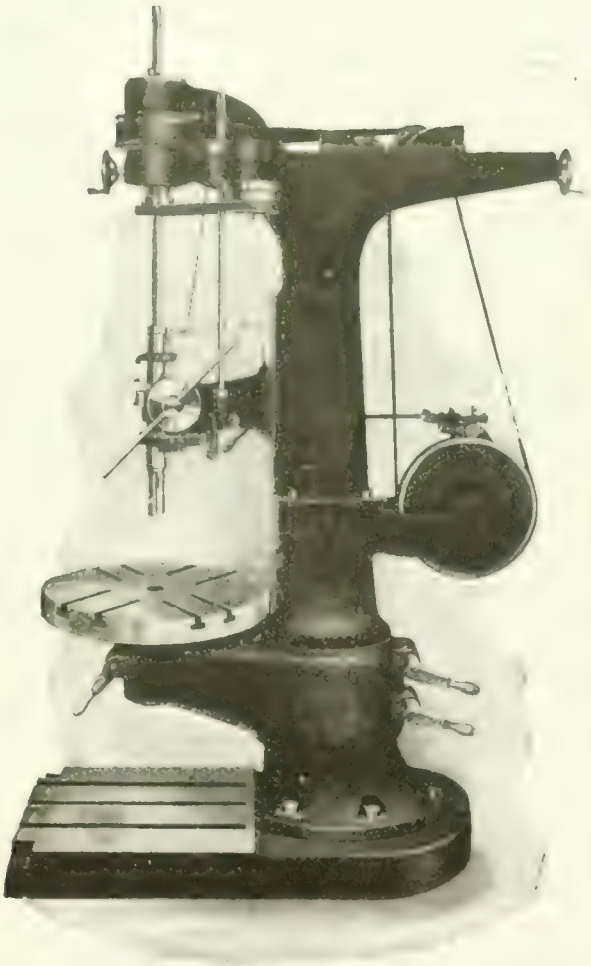

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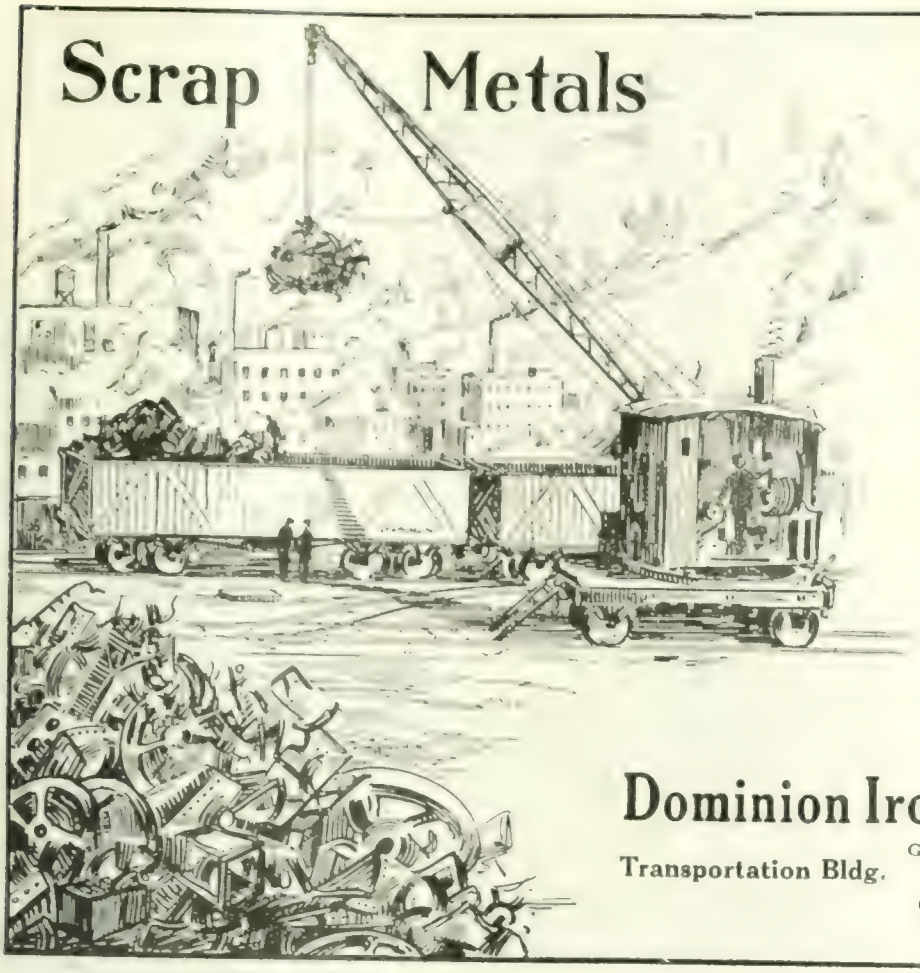

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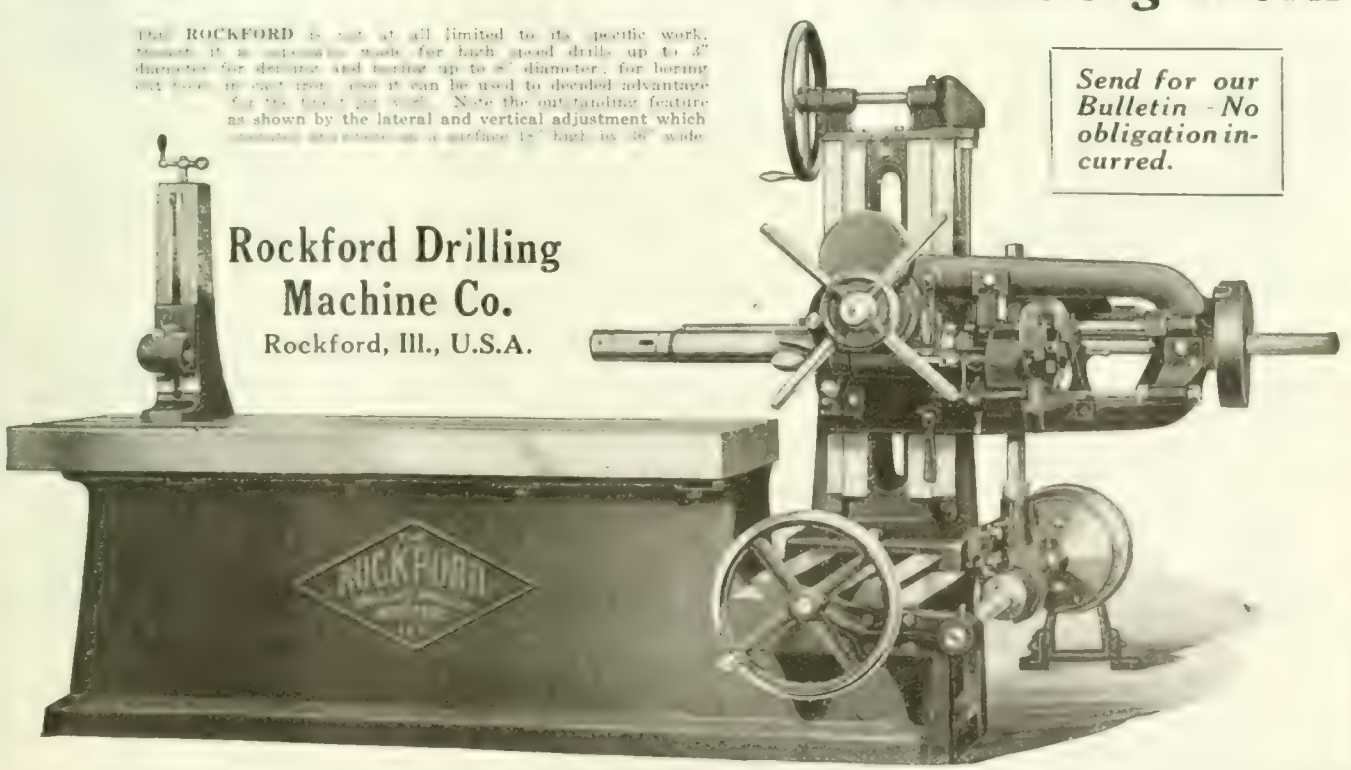

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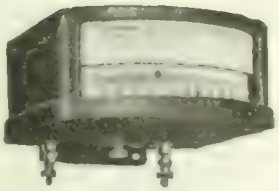

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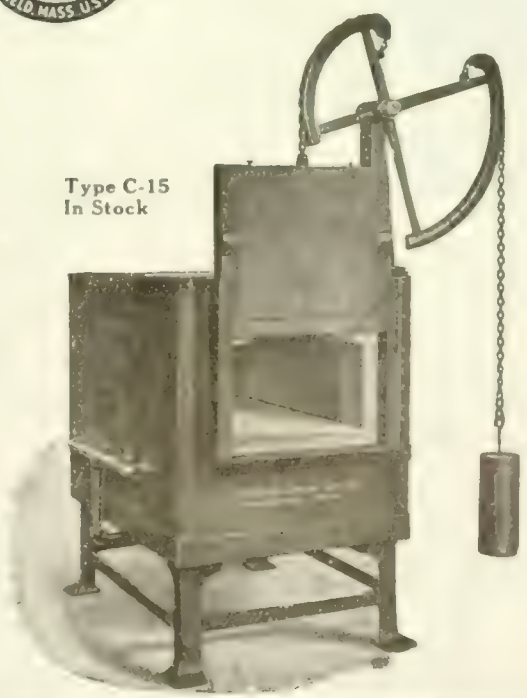

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PUMPS, LUBRICANT, OIL
Bellevue Industrial Furnace Co., Detroit, Mich
Bowser & Co., Inc., S. F., Toronto, Ont.
Roper, C. F., Co., Hopedale, Mass.
Trahern Pump Co., Rockford, Ill.

PUMP LEATHERS
Can. B. K. Morton, Toronto, Montreal.
Graton & Knight Mfg. Co., Worcester, Mass.

PUMPS, ROTARY, POWER DRIVEN
Bowser & Co., Inc., S. F., Toronto, Ont.
Trahern Pump Co., Rockford, Ill.

PUNCHES AND DIES
W. H. Banfield & Sons, Toronto.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Canada.
Can. Blower & Forge Co., Kitchener, Ont.
Ferracute Mach. Co., Bridgeton, N.J.
Can. Fairbanks-Morse Co., Montreal.
Gardner, Robt., & Son, Montreal.
A. B. Jardine & Co., Hespeler, Ont.
Mulliner-Enlund Tool Co., Syracuse, N.Y.
Petrie, Ltd., H. W., Toronto, Ont.
Pratt & Whitney Co., Dundas, Ont.
Toledo Machine & Tool Co., Toledo, O.

PUNCHES, POWER
John Bertram & Sons Co., Dundas.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Canada.
Canada Machinery Corp., Galt, Ont.
Consolidated Press Co., Hastings, Mich.
Ferracute Mach. Co., Bridgeton, N.J.
Niles-Bement-Pond Co., New York.

PUNCHING MACHINES, HORIZONTAL
Bertrams, Ltd., Edinburgh, Scotland.
John Bertram & Sons Co., Dundas.
Canada Machinery Corp., Galt, Ont.
E. W. Bliss Co., Brooklyn, N.Y.
Brown, Boggs Co., Ltd., Hamilton, Canada.
Niles-Bement-Pond Co., New York.
W. A. Whitney Mfg. Co., Rockford, Ill.

PURIFYING AND SOFTENING APPARATUS
Scaife & Sons Co., Wm. B., Pittsburgh, Pa.

PYROMETERS
Bellevue Industrial Furnace Co., Detroit, Mich.
Can. Hoskins, Ltd., Walkerville, Ont.
Holz, Herman A., 1 Madison Ave., New York.
Shore Instrument & Mfg. Co., New York City.
H. E. Streeter, New Birks Bldg., Montreal, Que
Taylor Instrument Co., Rochester, N.Y.
Thwing Instrument Co., Philadelphia, Pa.

QUARTERING MACHINES
John Bertram & Sons Co., Dundas.
Niles-Bement-Pond Co., New York.

RAILING, IRON AND BRASS (SEE GUARDS)

RAIL BENDERS
Niles-Bement-Pond Co., New York.

RAILROAD TOOLS
Can. Fairbanks-Morse Co., Montreal.
Cumming & Son, J. W., New Glasgow, Canada.
Niles-Bement-Pond Co., New York.

RAILS, STEEL
Cumming & Son, J. W., New Glasgow, Canada.

RATCHETS
Keystone Mfg. Co., Buffalo, N.Y.

RAW HIDE PINIONS (SEE GEARS)

REAMER FLUTING MACHINES
Garvin Machine Co., New York.

REAMERS, ADJUUSTABLE
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Osborn (Canada), Ltd., Sam'l, Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.
Standard Machy. & Supplies, Ltd., Montreal, Que.
H. E. Streeter, New Birks Bldg., Montreal, Que.
Whitman & Barnes Mfg. Co., St. Catharines, Ont.

REAMERS, BRIDGE, EXPANDING AND HIGH SPEED
Aikenhead Hardware Co., Toronto.
Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Clark Equipment Co., Buchanan, Mich.
Cleveland Twist Drill Co., Cleveland.
Illinois Tool Works, Chicago, Ill.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
McKenna Brothers, Pittsburgh, Pa.
Osborn (Canada), Ltd., Sam'l, Montreal, Que.
Pratt & Whitney Co., Dundas, Ont.

REAMERS, PIPE, CYLINDER AND LOCOMOTIVE
Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Petrie, Ltd., H. W., Toronto, Ont.
Pratt & Whitney Co., Dundas, Ont.

REAMERS, STEEL TAPER AND SELF-FEEDING
Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Clark Equipment Co., Buchanan, Mich.
Cleveland Twist Drill Co., Cleveland.
Illinois Tool Works, Chicago, Ill.
A. B. Jardine & Co., Hespeler, Ont.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Petrie, Ltd., H. W., Toronto, Ont.
Pratt & Whitney Co., Dundas, Ont.

REAMING MACHINES, PNEUMATIC
Cleveland Pneumatic Co. of Canada, Toronto.
Garlock-Walker Machinery Co., Toronto, Ont.

RECORDING INSTRUMENTS
Bristol Co., Waterbury, Conn.
Taylor Instrument Co., Rochester, N.Y.

REGULATORS, PRESSURE, TEMPERATURE
Can. Fairbanks-Morse Co., Montreal.
Taylor Instrument Co., Rochester, N.Y.

RESPIRATORS
Strong, Kennard & Nutt Co., Cleveland, Ohio.

RIVET MACHINES
Bilton Mach. Tool Co., Bridgeport, Conn.
Can. Blower & Forge Co., Kitchener, Ont.
Grant Mfg. & Machine Co., Bridgeport, Conn.
National Machinery Co., Tiffin, O.

RIVETS, TUBULAR, BIFURCATED
Parmenter & Bulloch Co., Gananoque.
Steel Co. of Canada, Ltd., Hamilton, Ont.

RIVETS, IRON, COPPER AND BRASS
Aikenhead Hardware Co., Toronto, Ont.
Parmenter & Bulloch Co., Gananoque.
Steel Co. of Canada, Ltd., Hamilton, Ot.

RIVETERS, PNEUMATIC, HYDRAULIC, HAMMER, COMPRESSION
Can. Fairbanks-Morse Co., Montreal.
Can. Ingersoll-Rand Co., Montreal.
Cleveland Pneumatic Tool Co. of Canada, Toronto
Garlock-Walker Machinery Co., Toronto, Ont.
Independent Pneumatic Tool Co., Chicago, Ill.
Niles-Bement-Pond Co., New York
Petrie, Ltd., H. W., Toronto, Ont.

RIVETING MACHINES, ELASTIC ROTARY BLOW
Grant Mfg. & Machine Co., Bridgeport, Conn.
High-Speed Hammer Co., Rochester, N.Y.
F. B. Shuster Co., New Haven, Conn.

ROLLS, BENDING AND STRAIGHTENING
John Bertram & Sons Co., Dundas
Brown, Boggs Co., Ltd., Hamilton, Canada.
Canada Machinery Corp., Galt, Ont.
Niles-Bement-Pond Co., New York
Toledo Machine & Tool Co., Toledo, O.

ROLLS, CRUSHING
The Jenckes Mach. Co., Ltd., Sherbrooke, Que.

RUBBER MILL MACHINERY
Bertrams, Ltd., Edinburgh, Scotland

RULES
Brown & Sharpe Mfg. Co., Providence
James Chesterman & Co., Ltd., Sheffield, Eng.
L. S. Starrett Co., Athol, Mass.

SAFETY APPLIANCES
Strong, Kennard & Nutt Co., Cleveland, Ohio.

SAFETY APPLIANCE GOGGLES
T. A. Wilson, Reading, Pa.

SAND BLASTS
Curtis Pneumatic Machinery Co., St. Louis, Mo.
The Jenckes Mach. Co., Ltd., Sherbrooke, Que.

SANDING MACHINES
Canada Machinery Corp., Galt, Ont.

SAW MILL MACHINERY
Can. Fairbanks-Morse Co., Montreal.
Canada Machinery Corp., Galt, Ont.
Gardner, Robt., & Son, Montreal
Curtis Pneumatic Machy. Co., St. Louis, Mo.
Petrie, Ltd., H. W., Toronto, Ont.
A. R. Williams Machy. Co., Toronto

SAWS, CIRCULAR METAL
Hunter Saw & Machine Co., Pittsburg, Pa.
Napier Saw Works, Springfield, Mass.
Tabor Mfg. Co., Philadelphia, Pa.

SAWS, HACK (SEE HACK SAWS)

SAWS, INSERTED TOOTH
Hunter Saw & Mach. Co., Pittsburgh, Pa.
Napier Saw Works, Springfield, Mass.
Tabor Mfg. Co., Philadelphia, Pa.

SAWS, BAND AND COPING
Napier Saw Works, Springfield, Mass.

SCLEROSCOPES
Shore Instrument & Mfg. Co., New York City
H. E. Streeter, New Birks Bldg., Montreal, Que.

SCREW MACHINE PARTS
Johnson Mach. Co., Carlyle, Manchester, Conn.

SCREW MACHINE PRODUCTS
Galt Machine Screw Co., Galt, Ont.
Eastern Mach. Screw Corp., New Haven, Conn.

SCREW MACHINES, HAND, AUTOMATIC
Brown & Sharpe Mfg. Co., Providence, R.I.
Can. Fairbanks-Morse Co., Montreal.
Foster Machine Co., Elkhart, Ind.
Garlock-Walker Machy. Co., Ltd., Toronto, Ont.
Garvin Machine Co., New York
Himoff Mach. Co., Inc., Astoria, L.I., New York.
A. B. Jardine & Co., Hespeler
New Britain Machine Co., New Britain, Conn.
Petrie, Ltd., H. W., Toronto, Ont.
Pratt & Whitney Co., Dundas, Ont.
Rivett Lathe & Grinder Co., Brighton, Mass.
Warner & Swasey Co., Cleveland, O.
A. R. Williams Machy. Co., Toronto

SCREW MACHINES, AUTOMATIC, MULTIPLE SPINDLE
New Britain Machine Co., New Britain, Conn.
Riverside Machinery Depot, Detroit, Mich.

SCREWS
Can. B. K. Morton, Toronto, Montreal
Galt Machine Screw Co., Galt, Ont.
National-Acme Co., Cleveland, Ohio
Steel Co. of Canada, Ltd., Hamilton, Ont.
Wilkinson & Kompass, Hamilton, Ont.

SCREW PLATES
Butterfield & Co., Rock Island, Que.
A. B. Jardine & Co., Hespeler
Morse Twist Drill & Mch. Co., New Bedford, Mass
Wells Bros. Co. of Canada, Galt, Ont.
Wilkinson & Kompass, Hamilton, Ont.

SCREW SLOTTERS
Garvin Machine Co., New York
Pratt & Whitney Co., Dundas, Ont.

SECOND-HAND MACHINERY
Davis Machine Tool Co., W. F., New York
Dominion Machinery Co., Toronto
Foss & Hill Machy. Co., Montreal
Hill, Clarke & Co., Chicago, Ill.
McCabe, J. J., New York, N.Y.
New York Machinery Exchange, New York
Petrie, Ltd., H. W., Toronto, Ont.
Riverside Machinery Depot, Detroit, Mich.
Strelinger Co., Chas. A., Detroit, Mich.
Stocker-Rumely-Wachs, Chicago, Ill.

SET SCREWS, SAFETY
Aikenhead Hardware Co., Toronto, Ont.
Allen Mfg. Co., Hartford, Conn.
Wilkinson & Kompass, Hamilton, Ont.

SHANKS, STRAIGHT AND TAPER
Jacobs Mfg. Co., Hartford, Conn.

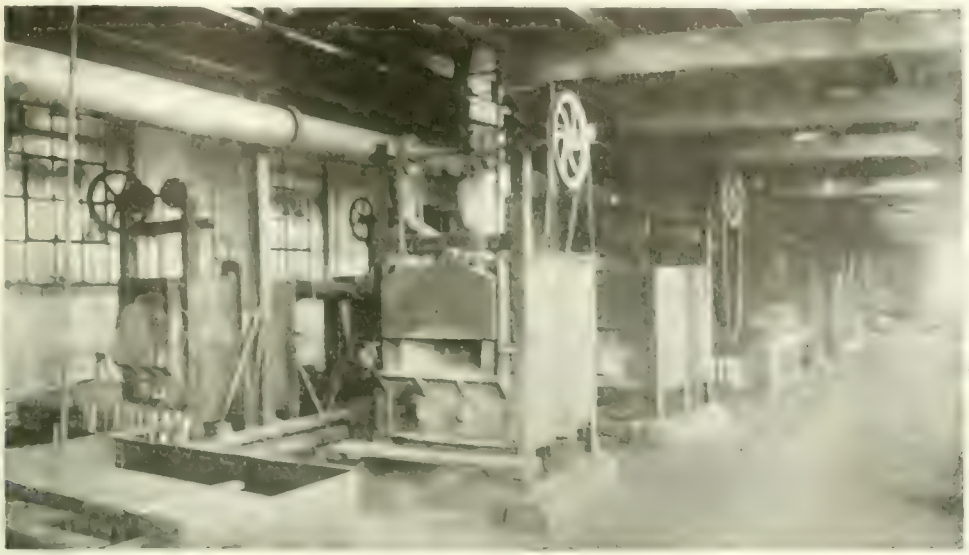
SHAPERS
John Bertram & Sons Co., Dundas
Can. Fairbanks-Morse Co., Montreal
Canada Machinery Corp., Galt, Ont.
Foss & Hill Machy. Co., Montreal
Gardner, Robt., & Son, Montreal
Hendey Machine Co., Torrington, Conn.
Hamilton Mach. Tool Co., Hamilton, Ohio
Petrie, Ltd., H. W., Toronto, Ont.
Rhodes Mfg. Co., Hartford, Conn.
Steptoe Co., John, Cincinnati, Ohio

SHAFTING
Can. Bond Hanger & Coup. Co., Alexandria, Ont
Can. Fairbanks-Morse Co., Montreal
Can. Drawn Steel Co., Hamilton, Ont
Garlock-Walker Machy. Co., Ltd., Toronto, Ont.
The Jenckes Mach. Co., Ltd., Sherbrooke, Que.
Niles-Bement-Pond Co., New York
Petrie, Ltd., H. W., Toronto, Ont.
Pratt & Whitney Co., Dundas, Ont.
Strelinger Co., Chas. A., Detroit, Mich.
A. R. Williams Machy. Co., Toronto
Wilkinson & Kompass, Hamilton, Ont.

SHAFTS, FLEXIBLE
Stow Mfg. Co., Binghampton, N.Y.

SHARPENING STONES
Carborundum Co., Niagara Falls, N.Y.
Norton Co., Worcester, Mass.

SHAVINGS, SEPARATOR
Can. Blower & Forge Co., Kitchener, Ont.
Sheldons, Ltd., Galt, Ont.



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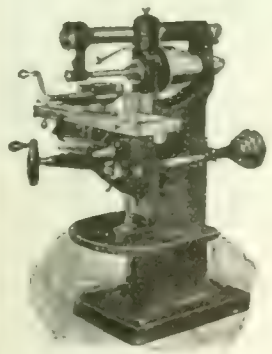

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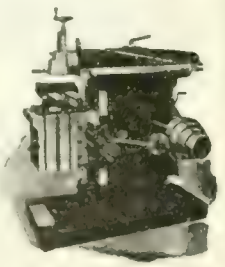

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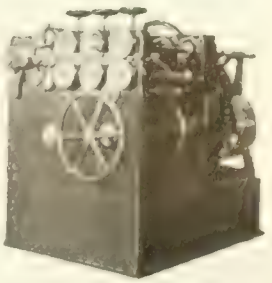

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High-Speed Automatics for Making Fuse and Small Arms Springs.

Flexible Metallic Tube and Casing Coilers.

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Montgomery, Smith & Co., Keynsham, Somerset, Eng.
Niles-Bement-Pond Co., New York
Toledo Machine & Tool Co., Toledo

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Brown, Boggs Co., Ltd., Hamilton, Canada
Can. Blower & Forge Co., Kitchener, Ont.
Canada Machinery Corp., Galt, Ont.
Ferrachute Machine Co., Bridgeton, N.J.
National Machy. Co., Tiffin, Ohio.
Niles-Bement-Pond Co., New York
Petrie, Ltd., H. W., Toronto, Ont.
Toledo Machine & Tool Co., Toledo

SHEARS, PNEUUMATIC
Toledo Machine & Tool Co., Toledo, Ohio.

SHEARS, SQUARING
Brown, Boggs & Co., Hamilton, Canada

SHEET METAL WORKING TOOLS
Baird Machine Co., Bridgeport, Conn.
Bliss, E. W., Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Canada
Peck, Stow & Wilcox, Southington, Conn.
Steel Bending Brake Works, Ltd., Chatham, Ont.

SHEET METAL STAMPINGS
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SHELL BANDING MACHINES, HYDRAULIC
Garlock-Walker Machy. Co., Ltd., Toronto, Ont.
The Jenckes Mach. Co., Ltd., Sherbrooke, Que.
Metalwood Mfg. Co., Detroit, Mich.
Perrin, Ltd., W. R., Toronto, Ont.
West Tire Setter Co., Rochester, N.Y.

SHELL PAINTING MACHINES
Can. Blower & Forge Co., Kitchener, Ont.
Sheldons, Ltd., Galt, Ont.

SHELL RIVETERS
Grant Mfg. & Machine Co., Bridgeport, Conn.
High Speed Hammer Co., Rochester, N.Y.

SHRAPNEL SHELL MARKER
Brown, Boggs & Co., Hamilton, Canada
Noble & Westbrook Mfg. Co., Hartford, Conn.

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Armstrong Bros. Tool Co., Chicago.
Baxter & Co., Ltd., J. R., Montreal, Que.
Can. B. K. Morton, Toronto, Montreal.

SIGNS, ENAMEL
Strong, Kennard & Nutt Co., Cleveland, Ohio.

SILVER SOLDER
Geo. H. Lees & Co., Hamilton, Ont.

SKATE SHARPENERS
Can. Bond Hanger & Cplg. Co., Alexandria, Ont.

SLEDGES
Aikenhead Hardware Co., Toronto, Ont.
Whitman & Barnes Mfg. Co., St. Catharines, Ont.
Wilkinson & Kompass, Hamilton, Ont

SLOTTERS
Garvin Machine Co., New York.
National-Acme Co., Cleveland, Ohio.
Niles-Bement-Pond Co., New York
Rhodes Mfg. Co., Hartford, Conn.

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MacKinnon, Holmes Co., Sherbrooke, Que.

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Brown & Sharpe Mfg. Co., Providence.
Clark Equipment Co., Buchanan, Mich.
Cleveland Twist Drill Co., Cleveland.
Keystone Mfg. Co., Buffalo, N.Y.
Modern Tool Co., Erie, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
J. H. Williams & Co., Brooklyn, N.Y.

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Allen Mfg. Co., Hartford, Conn.

SOLDERING IRONS
Aikenhead Hardware Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
Brown, Boggs & Co., Hamilton, Canada

SOLDERS
Aikenhead Hardware Co., Toronto, Ont.
Tallman Brass & Metal Co., Hamilton.

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Bertram, John, & Sons Co., Dundas.
Bliss, E. W. Co., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Canada
Brown Engineering Corp., Toronto, Ont
Can. Fairbanks-Morse Co., Montreal.
Charles F. Elmes Eng. Works, Chicago.
Ferracute Mach. Co., Bridgeton, N.J.
Garlock-Walker Machy. Co., Ltd., Toronto, Ont.
Garvin Machine Co., New York.
Gooley & Edlund, Inc., Courtland, N.Y.
Grant Mfg. & Machy. Co., Bridgeport, Conn.
Gray Mfg. & Mach. Co., Toronto, Ont
John H. Hall & Sons, Brantford.
Himoff Mach. Co., Inc., Astoria, L.I., New York.
Illinois Tool Works, Chicago, Ill.
A. B. Jardine & Co., Hespeler, Ont.
The Jenckes Mach. Co., Ltd., Sherbrooke, Que.
McClean & Son, F. W., Niagara Falls, Ont.
National-Acme Co., Cleveland, Ohio.
D. McKenzie Machinery Co., Guelph, Ont.
Mulliner & Enlund Tool Co., Syracuse, N.Y.
Prest-O-Lite Co., Inc., Toronto, Ont.
Rhodes Mfg. Co., Hartford, Conn.
Riverside Machinery Depot, Detroit, Mich.
Sleeper & Hartley, Inc., Worcester, Mass.
Smart-Turner Machine Co., Hamilton, Ont.
T. C. M. Mfg. Co., Harrison, N.J.
Victoria Foundry Co., Ottawa, Ont.
Welland Metal & Machine Co., Welland, Ont.
William R. Perrin, Ltd., Toronto.
Winnipeg Gear & Engr. Co., Winnipeg, Man.

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Sleeper & Hartley, Inc., Worcester, Mass.

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SPIRAL CONVEYORS
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SPROCKETS, CHAIN
Grant Gear Works, Boston, Mass.
Morse Chain Co., Ithaca, N.Y.
Philadelphia Gear Works, Philadelphia, Pa.

SOLDER
Jobborn, Geo. A., Hamilton, Ont.

SPROCKET WHEELS, CAST
Perrin, Wm. R., Toronto.

STAIRS, IRON
Canada Wire & Iron Goods Co., Hamilton, Ont.

STAMPINGS
Dillon Mfg. Co., Oshawa, Ont.
Dom. Forge & Stamping Co., Walkerville, Ont.
Homer & Wilson, Hamilton, Ont.

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Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs & Co., Hamilton, Canada
Canada Machinery Corp., Galt, Ont.
Ferracute Mach. Co., Bridgton, N.J.
Noble & Westbrook Mfg. Co., Hartford, Conn.

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Matthews, Jas. H. & Co., Hartford, Conn.
Noble & Westbrook Mfg. Co., Hartford, Conn.
Pritchard-Andrews Co., Ottawa, Can.

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Can. Morehead Mfg. Co., Woodstock, Ont.
Petrie, Ltd., H. W., Toronto, Ont.
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Sturtevant Co., B. F., Galt, Ont.

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Colonial Steel Co., Pittsburgh, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Osborn (Canada), Ltd., Sam'l, Montreal, Que.
Vanadium-Alloys Steel Co., Pittsburgh, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.
Zenith Coal & Steel Products, Montreal, Que.

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Can. Drawn Steel Co., Hamilton, Ont.
Union Drawn Steel Co., Hamilton, Ont.

STEEL DRUMS
Smart-Turner Machine Co., Hamilton, Ont.

STEEL PRESSURE BLOWERS
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Can. Fairbanks-Morse Co., Montreal.
Sheldons, Ltd., Galt, Ont.
Sturtevant Co., B. F., Galt, Ont.

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Can. B. K. Morton, Toronto, Montreal.
Century Steel Co. of America, New York
Colonial Steel Co., Pittsburgh, Pa.
H. A. Drury Co., Ltd., Montreal.
Eagle & Globe Steel Co., Montreal, Que.
Fairley Davidson Steel Co., New York, N.Y.
Hawkridge Bros. Co., Boston, Mass.
Latrobe Electric Steel Co., Latrobe, Pa.
Marshall & Co., Geo. A., Toronto, Ont
Osborn (Canada), Ltd., Sam'l, Montreal, Que.
Petrie, Ltd., H. W., Toronto, Ont.
Standard Alloys Company, Pittsburgh, Pa.
Vanadium-Alloys Steel Co., Pittsburgh, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.; represented in Canada by Norton, Callard & Co., Montreal, Que.
Zenith Coal & Steel Products, Montreal, Que.

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Vanadium-Alloys Steel Co., Pittsburgh, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.

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Wells Bros. Co. of Canada, Galt, Ont.

STOOLS, STEEL, SHOP
New Britain Machine Co., New Britain, Conn.

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Baird Machinery Co., Bridgeport, Conn.
Bertrams, Ltd., Edinburgh, Scotland.

SWITCHES, RAILWAY
Can. Steel Foundries, Ltd., Montreal.

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The Jenckes Mach. Co., Ltd., Sherbrooke, Que.
MacKinnon, Holmes & Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.

TANKS, STEEL, WATER PRESSURE
Bowser & Co., Inc., S. F., Toronto, Ont
Can. Welding Works, Montreal, Que.
Jenckes Machine Co., Sherbrooke, Que.
MacKinnon, Holmes Co., Sherbrooke.
St. Lawrence Welding Co., Montreal, Que
Toronto Iron Works, Ltd., Toronto.

TANK WAGONS
Jenckes Mach. Co., Sherbrooke, Que.
MacKinnon, Holmes Co., Sherbrooke.
St. Lawrence Welding Co., Montreal, Que.
Toronto Iron Works, Ltd., Toronto.

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Garvin Machine Co., New York.
The Geometric Tool Co., New Haven.
J. H. Hall & Sons, Brantford, Ont.
A. B. Jardine & Co., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Manufacturers Equipment Co., Chicago, Ill.
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., Detroit.
Niles-Bement-Pond Co., New York
Petrie, Ltd., H. W., Toronto, Ont.
Rickert-Shafer Co., Erie, Pa.
L. S. Starrett Co., Athol, Mass.
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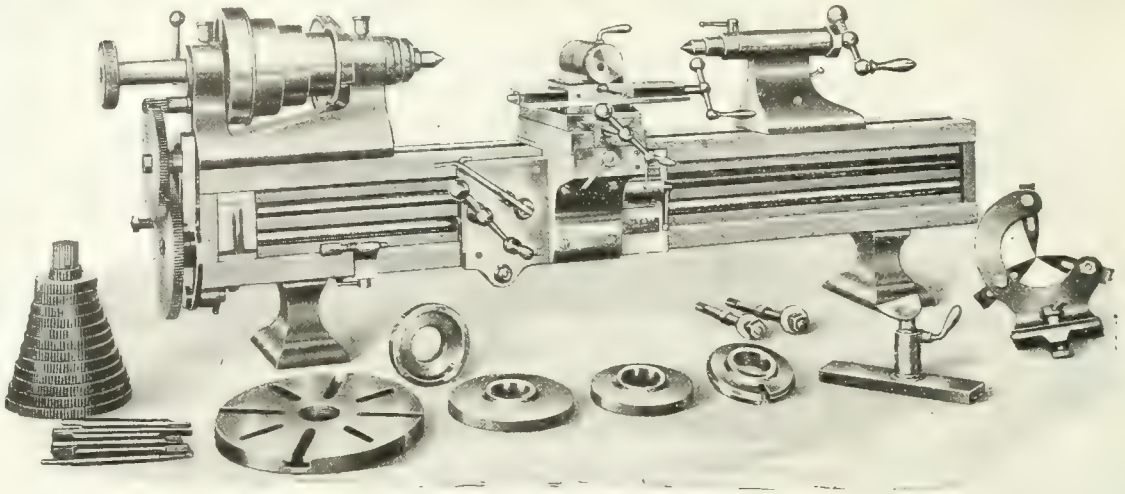

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A weekly newspaper devoted to the machinery and manufacturing interests.

Vol. XVIII. TORONTO, OCTOBER 18, 1917 No. 16

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Cable Address: Macpubco, Toronto; Atabek, London, Eng.

PUBLISHED 1887.

CANADIAN MACHINERY AND MANUFACTURING NEWS

PETER BAIN, M.E., Editor. B. G. NEWTON, Manager.

Associate Editors: A. G. WEBSTER, J. M. WILSON, J. H. RODGERS.

CHIEF OFFICES:

CANADA—Montreal, Southam Building, 128 Bleury Street, Telephone 1004; Toronto, 143-153 University Ave., Telephone Main 7324; Winnipeg, 1207 Union Trust Building, Telephone Main 3449.

GREAT BRITAIN—LONDON, The MacLean Company of Great Britain, Limited, 88 Fleet Street, E.C., E. J. Dodd, Director. Telephone Central 12960. Cable address: Atabek, London, England.

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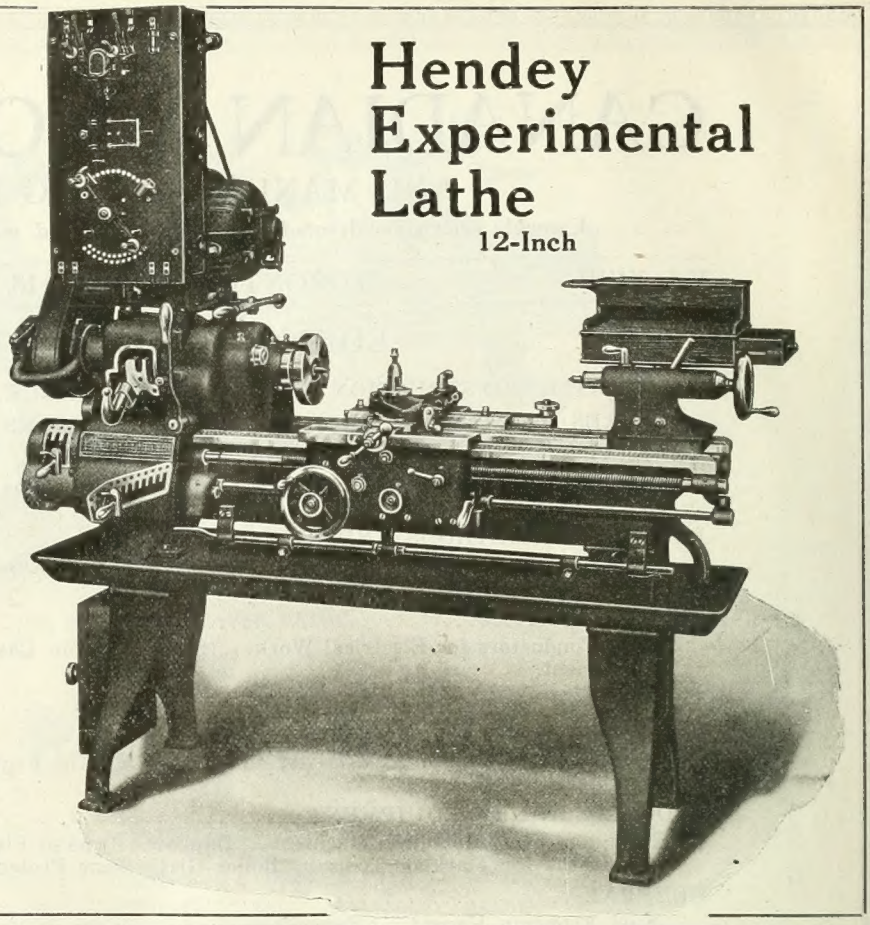

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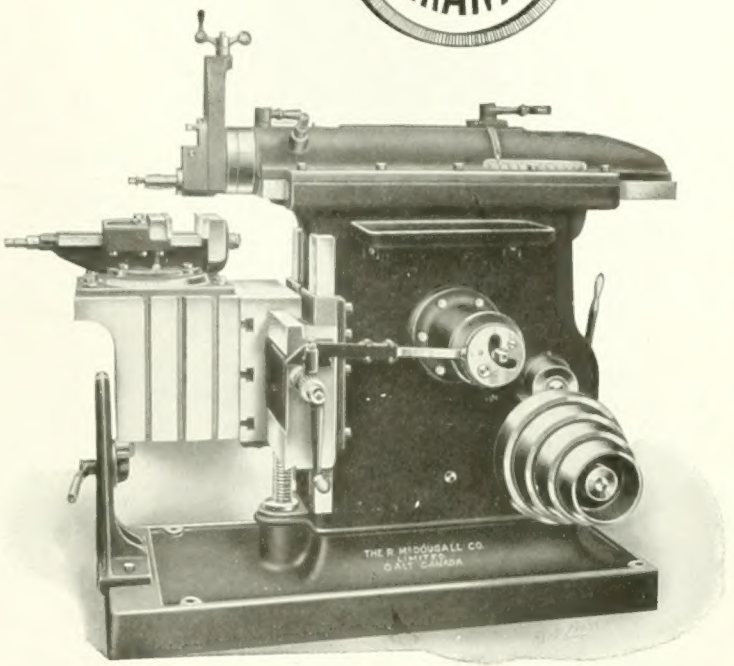

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1—15 x 10 South Bend standard lathe
1—13 x 5 Champion standard lathe
1—12 x 5 Perfect standard lathe
1—13 x 5 Himoff standard lathe
4—21 x 8 Le Blond turret turning lathes
6—21 x 8 Le Blond turning lathes
4—18 x 8 Battle Creek heavy duty turning lathes
1—24 x 24 New Haven standard engine lathe
1—16 x 8 Gardener standard engine lathe
1—No. 6 Foster screw machine
1—No. 4 Foster screw machine

The Foss & Hill Machinery Company

305 ST. JAMES ST., MONTREAL, QUE.

C.M.C.

We have built Machine Tools and Woodworking Machinery for many years, using the highest grade materials and employing the most skilled workmen obtainable. Our Plant at Galt, Ontario, speaks success well earned.

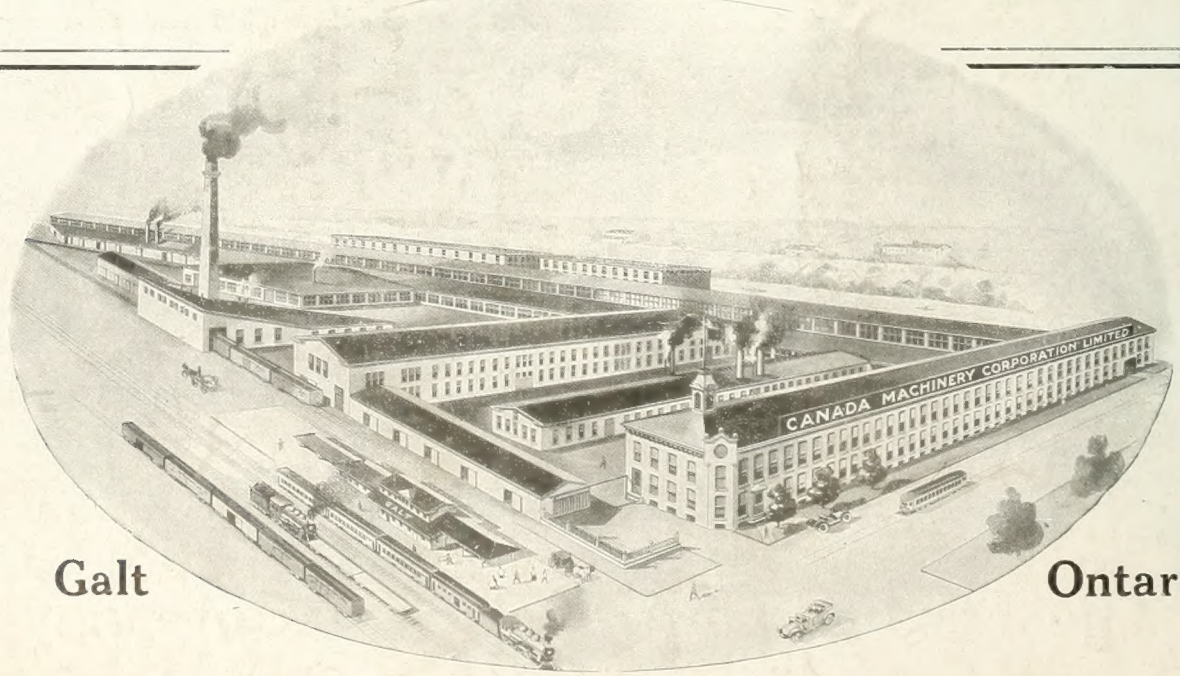
Machine Tools

Lathes
Shapers
Drills
Hammers
Planers
Slotters
Punches
Shears
Presses

Woodworking Machinery

Moulders
Planers
Matchers
Rip-Saws
Band-Saws
Sanders
Borers
Tenoners
Mortisers

CANADA MACHINERY CORPORATION
LIMITED



Galt Ontario

Show Rooms at Brock Avenue Subway, Toronto, Ontario